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National Defense Authorization

NATIONAL DEFENSE AUTHORIZATION ACT
FOR FISCAL YEAR 2005—H.R. 4200

AND

OVERSIGHT OF PREVIOUSLY AUTHORIZED
PROGRAMS

BEFORE THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES
ONE HUNDRED EIGHTH CONGRESS

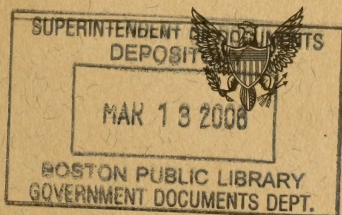
SECOND SESSION

TACTICAL AIR AND LAND FORCES SUBCOMMITTEE
HEARING

ON

TITLE I—PROCUREMENT
TITLE II—RESEARCH, DEVELOPMENT,
TEST, AND EVALUATION

HEARINGS HELD
MARCH 4, 17, 25 AND APRIL 1, 2004



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[There were no Documents submitted.]

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[There were no Questions submitted.]

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108TH CONGRESS
2D SESSION

H. R. 4200

To authorize appropriations for fiscal year 2005 for military activities of the Department of Defense, to prescribe military personnel strengths for fiscal year 2005, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

APRIL 22, 2004

MR. HUNTER (for himself and Mr. SKELTON) (both by request) introduced the following bill; which was referred to the Committee on Armed Services

A BILL

To authorize appropriations for fiscal year 2005 for military activities of the Department of Defense, to prescribe military personnel strengths for fiscal year 2005, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "National Defense Authorization Act for Fiscal Year 2005".

* * * * *

DIVISION A—DEPARTMENT OF DEFENSE AUTHORIZATIONS

TITLE I—PROCUREMENT

Subtitle A—Authorization of Appropriations

SEC. 101. ARMY.

Funds are hereby authorized to be appropriated for fiscal year 2005 for procurement for the Army as follows:

- (1) For aircraft, \$2,658,241,000.
- (2) For missiles, \$1,398,321,000.
- (3) For weapons and tracked combat vehicles, \$1,639,695,000.
- (4) For ammunition, \$1,556,902,000.
- (5) For other procurement, \$4,240,896,000.

SEC. 102. NAVY AND MARINE CORPS.

(a) NAVY.—Funds are hereby authorized to be appropriated for fiscal year 2005 for procurement for the Navy as follows:

- (1) For aircraft, \$8,767,867,000.
- (2) For weapons, including missiles and torpedoes, \$2,101,529,000.
- (3) For shipbuilding and conversion, \$9,962,027,000.

(VII)

(4) For other procurement, \$4,834,278,000.

(b) MARINE CORPS.—Funds are hereby authorized to be appropriated for fiscal year 2005 for procurement for the Marine Corps in the amount of \$1,190,103,000.

(c) NAVY AND MARINE CORPS AMMUNITION.—Funds are hereby authorized to be appropriated for fiscal year 2005 for procurement of ammunition for the Navy and Marine Corps in the amount of \$858,640,000.

SEC. 103. AIR FORCE.

Funds are hereby authorized to be appropriated for fiscal year 2005 for procurement for the Air Force as follows:

- (1) For aircraft, \$13,163,174,000.
- (2) For missiles, \$4,718,313,000.
- (3) For procurement of ammunition, \$1,396,457,000.
- (4) For other procurement, \$13,283,557,000.

SEC. 104. DEFENSE-WIDE ACTIVITIES.

Funds are hereby authorized to be appropriated for fiscal year 2005 for Defense-wide procurement in the amount of \$2,883,302,000.

Subtitle B—Multiyear Procurement Authorization

SEC. 111. MULTIYEAR PROCUREMENT AUTHORITY FOR THE LIGHT WEIGHT 155 MILLIMETER HOWITZER PROGRAM.

The Secretary of the Navy may, in accordance with section 2306b of title 10, United States Code, enter into a multiyear contract, beginning with the fiscal year 2005 program year, for procurement of the light weight 155 millimeter howitzer.

TITLE II—RESEARCH, DEVELOPMENT, TEST, AND EVALUATION

Subtitle A—Authorization of Appropriations

SEC. 201. AUTHORIZATION OF APPROPRIATIONS.

Funds are hereby authorized to be appropriated for fiscal year 2005 for the use of the Department of Defense for research, development, test, and evaluation, as follows:

- (1) For the Army, \$9,266,258,000.
- (2) For the Navy, \$16,346,391,000.
- (3) For the Air Force, \$21,114,667,000.
- (4) For Defense-wide activities, \$21,044,972,000, of which \$305,135,000 is authorized for the Director of Operational Test and Evaluation.

Subtitle B—Ballistic Missile Defense

SEC. 211. FUNDING FOR MISSILE DEFENSE AGENCY.

(a) Funds appropriated under the heading "Research, Development, Test and Evaluation, Defense-Wide" for the Missile Defense Agency may, upon approval by the Secretary of Defense, be used for the development and fielding of ballistic missile defense capabilities.

(b) This section shall be effective for fiscal years after Fiscal Year 2004.

FISCAL YEAR 2005 NATIONAL DEFENSE AUTHORIZATION ACT—THE AVIATION INDUSTRIAL BASE AND DEPARTMENT OF DEFENSE ROTORCRAFT INVESTMENT PROGRAMS

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE,
Washington, DC, Thursday, March 4, 2004.

The subcommittee met, pursuant to call, at 9:05 a.m., in room 2118, Rayburn House Office Building, Hon. Curt Weldon (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

Mr. WELDON. The subcommittee will come to order. This morning, the Tactical Air and Land Forces Subcommittee meets to receive testimony from Government and industry witnesses on three important subjects. But before I go through the subjects and introduce the hearing, I want to acknowledge, first of all, someone in the audience who is a close personal friend and someone who has been in the lead on aviation safety in this country. And that is Dick Healing.

Dick, would you rise? Dick was the head of aviation safety for the Navy and did tremendous work in helping us deal with some of our most difficult problems in aviation. And he is now on the National Transportation Safety Board.

So we welcome you and appreciate your involvement in this hearing.

And second, I would like to just, for the record, mention that four members of this committee and three other members just got back from a delegation I led to Libya, the second delegation to Libya in 30 days, in what I would call one of the most historic events. And if I had to equate it, I would equate it with the downing of the Berlin Wall and the day that Boris Yeltsin stood on top of the tank outside of the Moscow White House and said that communism was dead. Because on our second day in Sirte, the capital city or the city where Qadhafi lives and where the Congress of Libya was meeting for their 27th anniversary session. Six hundred delegates from all over the country were assembled in the auditorium and 100 representatives of other countries, including all the African nations, the West, the Far East, and Europe. I represented the U.S. with our delegation and had a chance to address the assembled elected officials from Libya about the new course that Qadhafi has announced for his country.

And 10 minutes later, Qadhafi spoke. And in a speech that most of us sat listening to with our mouths open, he totally and completely renounced the past 20 years of Libyan involvement in terrorism and documented each and every specific instance where Libya had been involved. From the Sandinistas to the Irish Republican Army, from the radical Palestinian groups to terrorist groups throughout the world and Africa, he documented that Libya played a very active role in everything from Pan-Am 103 to other incidents that occurred during that time period.

And his statement to the Libyan people, which was broadcast live over their television, was that he was announcing that they were wrong, that the only thing that had been accomplished during that time period was the isolation of Libya and its people. And the hurt that had occurred during that time period was more on the Libyan people than anyone else.

And that was the reason why he came to a conclusion that Libya should not only totally and completely renounce terrorism and open up its doors for the U.S. and the world community to work together for transparent understanding of terrorism, but that Libya would immediately give up all of its weapons of mass destruction—which they have begun to do—and to rejoin the world community. And those other multinational groups that Libya had refused to belong to, he announced that they were joining. In fact, on our trip, they even talked of Libya's desire to become an observer at Helsinki to oversee the implementation of the Helsinki Final Act, which guarantees human rights.

So what an amazing turnaround for a leader, identified perhaps as much as anyone else with terrorism in the world, to in front of his own people totally renounce terrorism and say that his country had been worse off because of what had occurred and encouraged everyone—including all the assembled Arab nations, the African nations, nations from the Far East; the leadership of the Chinese Congress was there from Beijing—to tell them that they should follow the direction that Libya was taking and rejoin the world community in peace.

And then he in fact embraced America and said, "If the Americans really hated us, when we kicked them off of our soil, when we shut down—" I guess it was Wheelus Air Force Base in, what year was that? 1969. We had a major military base there and the Libyans shut it down and said "Leave."

He said, "If they really wanted to, they could have stayed and they could have had a war with us and probably easily defeated us." "But," he said, "they did not do it. They left peacefully." And we left on amicable terms.

And he said, "So the Americans do not want to dominate us. They never have. And we are sure that, as a new aspiring democracy, if we are attacked, they will come to our aid."

So it truly was a landmark event. And I was happy that our committee, both Democrats and Republicans from this committee, were able to be there and share a part of this major new turnaround in the world, which was absolutely, unbelievably, overwhelmingly dramatic.

And thank goodness we had a reporter there who documented all of this. We were able to get him in with us, Ken Kimmerman. And he has been reporting daily on these stories of what transpired.

But the world needs to understand the significance of Muammar Qadhafi's complete turnaround. And I am glad this committee was a part of that.

Our topic today is threefold: the views and implementing action, where appropriate, from representatives of the Departments of Defense and Commerce on the recommendations contained in the November 2002, "Final Report of the Commission on the Aerospace Industry;" second, the view of the American Helicopter Society International provided by its executive director on the health of the rotorcraft industrial base and the issues of primary interest to the rotorcraft industry; and three, the rotorcraft programs and the related fiscal year 2005 budget requests from witnesses from the Departments of the Army and Navy.

The Final Report of the Commission on the Future of the Aerospace Industry was submitted to the President and Congress in November of 2002. That report made some striking, broad conclusions in assessing the national aerospace industry. These conclusions include "the critical underpinning of this Nation's aerospace industry are showing signs of faltering."

The Nation stands "dangerously close to squandering the advantage bequeathed to us by prior generations. The Federal Government is dysfunctional when addressing 21st century issues from a long-term, national and global perspective."

And finally, "The Nation is at risk in the future if the United States continues to proceed without a policy that supports aerospace capabilities."

The commission notes the number of aerospace suppliers has dropped from 70 in 1980 to five prime contractors today, 600,000 scientific and technical aerospace jobs have been lost in the last 13 years and the number of aerospace scientists has dropped from 145,000 in 1986 to fewer than 25,000 today.

Further, the Aerospace Industries Association reports that U.S. market share of global commercial sales dropped from 72 to 52 percent between 1985 and 2000, aerospace profits are at their lowest level in 8 years and the aerospace trade surplus has experienced a 32 percent drop since its high of \$41 billion in 1998.

The commission report also concludes that U.S. aerospace companies are disadvantaged in the international marketplace due to foreign government market intervention in areas such as subsidies, tax policy, export financing and standards.

The Departments of Defense and Commerce, working through the interagency process, have had over a year to review and consider the report. We hope to hear from the representatives of the Departments of Defense and Commerce on whether they agree with these general conclusions and other specific conclusions and recommendations of the commission and if so, what has been done or is contemplated as corrective action. We also hope to hear from our rotorcraft industry association witness on his assessment of the commission's views and whether in his view adequate action is being taken to provide our aerospace industry an economic level playing field in international commerce.

Our Department of the Army and Navy witnesses will update us on their rotorcraft programs. We are particularly interested in the details of the restructured Army aviation program, the joint V-22 program and the status of the V-XX program.

We have two panels: the first, representing the Departments of Defense and Commerce and the American Helicopter Society International, to discuss the Commission on the Aerospace Industry report and the rotorcraft industrial base; and the second, representing the Department of the Army and the Department of the Navy, to discuss their rotorcraft programs.

On the first panel, representing the Department of Defense, Mr. Al Shaffer, Director for Plans and Programs for the Director of the Defense Research and Engineering Office, Office of the Secretary of Defense; representing the Department of Commerce, Deputy Secretary Joseph Bogosian; and representing the American Helicopter Society International is the Executive Director, Mr. Rhett Flater.

Our second panel will be comprised of: Major General James Thurman, Director of the Army Aviation Task Force; Dr. Thomas Laux, Program Executive Officer, Air Anti-Submarine Warfare, Assault and Special Missions. Dr. Laux is accompanied by Rear Admiral Andy Winns, Deputy Aviation Requirements Officer for Helicopters, and Brigadier General Sam Helland, U.S. Marine Corps.

Thank you to all of our witnesses for joining us. We look forward to your testimony.

Before we begin, I would like to ask my good friend from Hawaii if he has any opening remarks. I know he was under the weather today. And I appreciate him coming out, in spite of not feeling well.

Thank you, Mr. Abercrombie.

[The prepared statement of Mr. Weldon can be found in the Appendix on page 55.]

STATEMENT OF HON. NEIL ABERCROMBIE, A REPRESENTATIVE FROM HAWAII, RANKING MEMBER, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

Mr. ABERCROMBIE. Mr. Chairman, thank you very much. I wanted to make sure that I got here to greet your return.

Mr. WELDON. Thank you.

Mr. ABERCROMBIE. I want to compliment you on your yet another chapter in the efforts that you have made on behalf of this Nation and certainly on behalf of the Congress, in making sure that the word "oversight" is taken literally. And we can always count on your expertise in that regard.

And I regret the fact that I could not accompany you this time due to previous commitments. However, I do want to indicate that I believe that I can state with some authority that you were not, as a result of the cancellation of the Comanche, engaged in sales overseas. Okay. That was good.

Mr. Chairman, if I could just make a couple of comments along that line before we begin because that obviously is an issue that we are going to have to deal with. The cancellation of any major military platform or the redirection usually—and in this instance, it is not different, I believe, Mr. Chairman—triggers these discussions about reallocations of funds, what the implications are going

to be for industry because of the size and depth of the money commitment, the people commitment, the time commitment.

There are serious and long-term consequences. I am sure our first panel—I compliment you, by the way, on the panels, Mr. Chairman—are aware of that as much or more than anybody else at the present time.

And so I have just some points that I want to raise that I hope you will have in mind as the testimony takes place or as the questions evolve and the answers come forward. And perhaps you can even address these things in the course of events as you see fit.

Already, there is widespread speculation in the Congress and certainly in the press and elsewhere that because of the enormous consequences fiscally and otherwise for the various companies involved that—I am not going to say political considerations because that is too easy a dismissal of the seriousness of the issue—but that decisions are going to have to be made with respect to the future, up to an even including arguments over who is going to get or how the contracts will proceed with the Marine One helicopters. I got kidded earlier this morning about that, that we may have to get one for you, Mr. Chairman. With your trips, we may have to allocate one for Mr. Weldon.

But it is a serious issue nonetheless. I want to make certain, Mr. Chairman—and I am sure our panel members who have this recommendation power and perhaps even decision authority—that we keep our competition going, that we are not just going to spread contracts out in order to try and make up for something. I am operating on the assumption, Mr. Chairman, that the decision on the Comanche was made for good and sufficient purposes with respect to the strategic interests of this country, number one, and decisions made on the basis of what the likely outcome was determined to be by those in authority and having the obligation to make that decision.

What I do not want to see happen—and I am sure I reflect your views and that of the rest of the committee—is that we end up in a situation then where we have to figure out how to take care of everybody. I think we have to apply the same exacting standards to decisions as to what we do regarding helicopters now as we did in determining whether or not we had this cancellation take place.

I hope that we are not going to start from a premise that individual corporations need to be accommodated. As much as there is a human temptation to want to do that because of the anxiety or the difficulties that may be experienced by people, nonetheless, it seems to me, Mr. Chairman, that it is vitally important now that we retain our standards, that we retain our objectivity, that we move forward on a basis where the public can be sure that the decisions we are making here on the committee reflect the best judgment and the best information and the best perspective that we can get, both from our witnesses and from the testimony that comes to them as a result of these hearings.

And I am going to be asking some questions along the line, I hope, that are pertinent to that. Thank you for giving me so much time. But I thought it was necessary to get that on the record.

Because I know what your standards are. And I just want to make sure that everybody understands that that is the process that we are going to follow here.

Mr. WELDON. Thank you, Mr. Abercrombie. You are always eloquent.

And I did not mention the Comanche. But as the chairman of this subcommittee, I could have focused this whole hearing on Comanche because the plant that was going to manufacture the Comanche is right next to my congressional district; in fact, the bulk of the employees there are constituents of mine.

And so if I took a parochial interest, that would have been a focus. But I understand the problem with that program.

In fact, I was mentioning on the way over to Libya to some of my colleagues from this committee that, in my first term in Congress, my first meeting as a member of this committee was in Bill Dickinson's office, then the ranking Republican. And the topic was the Comanche.

And as the Army sat in the room, Bill Dickinson said, "Will you guys get your act together on the Comanche? We just do not know what you want." That was 18 years ago—18 years ago.

After six restructurings of the program, we wonder why the program was canceled. After \$6 billion of investment, we wonder why.

And I am not blaming anyone. I am blaming a system that needs to be looked at and needs to be more fully understood so that we do not repeat that in the future.

And so that is my comment about the Comanche, that I understand why we ended up being where we were. And unfortunately, my constituent base took the bulk of the heat in terms of that cancellation. But that sometimes happens in this city because of tough decisions we have to make.

So I thank you for your comments. And I welcome the opportunity for you to provide a special aircraft for me for future trips to other foreign, distant lands.

With that, I would like to proceed with the first panel——

Mr. ABERCROMBIE. I guarantee, you will not find one that has a fuel supply that will get you all the way to Hawaii. [Laughter.]

Mr. WELDON [continuing]. And then go into questions for that panel and then take testimony from the second panel, which will then be followed by questions.

And Members are also being torn. There are a number of competing conferences and meetings that are taking place.

So I do appreciate the Members that are here. I understand you have other commitments. But I appreciate as much time as you can spend for this very important hearing.

All of the witnesses' prepared testimony will be accepted for the record without objection. And I can guarantee those in the audience and our witnesses, every Member of Congress is vitally interested in where we are in terms of aviation and specifically in terms of rotorcraft.

So Mr. Shaffer, the floor is yours. And again, your statement is a part of the record.

STATEMENT OF ALAN R. SHAFFER, DIRECTOR, PLANS AND PROGRAMS FOR THE DIRECTOR, DEFENSE RESEARCH & ENGINEERING, OFFICE OF THE SECRETARY OF DEFENSE

Mr. SHAFFER. Thank you, Mr. Chairman, members of the committee. Thank you for the opportunity to appear before you today to provide an update on the progress made by the DOD research and engineering program in acting on the recommendations made in the Walker Commission Report. While the report had nine broad recommendations, I want to focus on the progress made by the DOD science and technology—or S&T—community in addressing this report.

Before addressing specifics of our S&T program, I will provide the DOD position on the applicable recommendations.

Recommendation 1: "The U.S. should pioneer new frontiers in aerospace technology, commerce and exploration." The Department agrees that the aerospace industry is critical to maintaining U.S. military supremacy in the 21st century and has increased the investment in air platform and space platform science and technology by over 60 percent since the fiscal year 2002 budget request.

Recommendation 2: "Transform the U.S. air transportation system as a national priority." In the summer of 2003, the Secretary of Defense demonstrated his commitment to this effort by appointing Secretary Roche as the DOD lead in working with National Aeronautics and Space Administration (NASA) and the Departments of Transportation, Homeland Security and Commerce to establish an air transportation system joint program development office.

Recommendation 3: "The DOD, NASA and industry should partner in innovative air and space technologies, especially in the areas of propulsion and power." Over the past two years, under the leadership of Dr. Ron Sega, the Director of Defense Research and Engineering, the DOD and NASA established the National Aerospace Initiative Coordination Office to synchronize research for high speed and hypersonic flight, space access and space technologies.

Recommendation 4: "The Nation should adopt a policy that invigorates the aerospace industrial base." This recommendation focused on acquisition policy. And the DOD continues to maintain stable science and technology funding for aviation and aerospace technology, which supports the DOD's recently revised acquisition process that encourages spiral development and technology insertion.

Recommendation 5: "The Federal Government should establish a national aerospace policy and promote aerospace by creating a government wide management strategy. The National Science and Technology Council is establishing an aerospace science and technology subcommittee with representation from all cabinet level agencies to address intergovernmental issues.

Recommendation 8: "The Nation should immediately reverse the decline in science and technology trained U.S. aerospace workforce." The decline of the science and engineering workforce, including the aerospace workforce, is an issue of concern to the DOD. U.S. science and engineer production as a whole is declining, while the production of scientists and engineers in the rest of the world is growing.

In order for the S&T aerospace workforce to grow, we believe at least two things must happen. There should be exciting projects to spark interest. And there should be incentives for young people to enter a scientific field.

In the DOD and NASA, there are cutting edge aviation projects to attract young researchers. Projects such as the Air Force/Defense Advanced Research Projects Agency (DARPA) Mach 7 single engine demonstration missile and the Mach 12 Army hydrogen-based missile demonstration are both world-class and exciting.

Over the past year, the DOD has increased both the total number of and annual stipends for graduate science and engineering fellowship programs. Since aerospace engineering is a key investment area for the DOD, the aviation industry should benefit.

We are continuing to examine our future workforce needs to ensure that we will have the best technical talent available for national security research and development (R&D).

The final recommendation of the commission report advised the Federal Government to significantly increase its investment in basic aerospace research. As mentioned previously, we have increased investment in aviation and space-related research by over 60 percent since the fiscal year 2002 budget request, with a shift in content.

Whether supporting the National Aerospace Initiative or in support of the Army's Future Combat Systems, the Department has a number of efforts that could lead to generational enhancement in aviation. Additionally, the National Aerospace Initiative has adopted some existing programs that continue to develop cutting edge technologies.

Under the National Aerospace Initiative, several projects should dramatically enhance aerospace capabilities. The integrated high performance turbine engine technology program has increased the operating parameters of the turbine engine to support next generation military and civilian engines for both fixed wing and rotary wing platforms.

While the versatile and affordable advanced turbine engines—VAATE—program has focused on the affordability and manufacture of follow-on turbine engines, the Navy HyFly and RATTLRS programs will fly a Mach 6 ramjet and Mach 4 turbine for missile application.

There is similar innovation in the Future Combat Systems of the Army. The Army and DARPA are collaborating on two unmanned rotorcraft demonstrations: the Unmanned Combat Aviation Rotorcraft (UCAR) and the A-160 Hummingbird. Both are pressing the rest of the world at integrating rotorcraft, communications and material sciences.

The list could be much longer. But in general, the DOD S&T program in aviation is one of growth and exciting possibilities for both air and space capabilities.

The Department is opening new regimes of speed, autonomous operations, power and airframes needed to move forward with industry into the next golden age of flight.

In closing, thank you for the opportunity to address the committee on the DOD S&T program's response to the Walker Commis-

sion Report. Aerospace research and systems have been and will continue to be at the forefront of the DOD's needs.

I would also like to point out that the Deputy Under Secretary of Defense for Industrial Policy has additionally submitted a statement for the record that addresses some of the industrial policy issues in the Walker Commission Report.

I look forward to answering your questions on the DOD S&T aviation program. Thank you.

[The prepared statement of Mr. Shaffer can be found in the Appendix on page 62.]

Mr. WELDON. Thank you very much for your testimony.

Mr. Bogosian.

STATEMENT OF JOSEPH H. BOGOSIAN, DEPUTY ASSISTANT SECRETARY FOR TRANSPORTATION AND MACHINERY, U.S. DEPARTMENT OF COMMERCE

Mr. BOGOSIAN. Good morning, Mr. Chairman, Congressman Abercrombie and distinguished members of the committee. On behalf of the U.S. Department of Commerce, thank you for the opportunity to share our views today. In my capacity at the Department, I focus on civil aerospace competitiveness issues.

Mr. Chairman, in a snapshot of the past 5 years, just over 80 percent of U.S. helicopter production served military needs.

Mr. WELDON. Hold the microphone a little closer? Thank you.

Mr. BOGOSIAN. And in that context, the Commerce Department has helped the commercial portion of the industry competitiveness and advocacy issues. I was asked to provide a high-altitude context for this hearing by discussing some of the larger industrial issues confronting all U.S. manufacturers and then some aerospace-specific global competitiveness issues.

I would like to start by reviewing some critical factors regarding the U.S. manufacturing sector as a whole. From June 2000 through January 2004, U.S. manufacturing jobs decreased by 17 percent.

U.S. manufacturing was further struck by the bursting of the technology bubble, accounting for the biggest stock market crash since the Great Depression, and the corporate accounting scandals. Aerospace manufacturing in particular was additionally hit by the SARS epidemic and the tragedy of September 11th.

The President acted decisively on national and economic priorities and his actions strengthened job creation. And his policies are working.

The U.S. economy grew at an 8.2 percent clip in the third quarter of 2003, the strongest growth in 20 years, and continued at an over four percent growth rate in the most recent quarter, while the unemployment rate was beaten back to 5.6 percent, below the average of each of the decades of the 1970's, 1980's and 1990's.

Mr. ABERCROMBIE. Mr. Chairman, excuse me, I am not quite sure what this has to do with our hearing. Can we get to the meat of the hearing, please? I can get that on Fox. I do not need that. Let's go.

Mr. BOGOSIAN. Sure. That is as a baseline because we are responding at the Department of Commerce to the overall challenges of U.S. manufacturing. All manufacturers are being—

Mr. ABERCROMBIE. I expect you would. Let us get to the meat of the hearing.

Mr. WELDON. The gentleman may proceed.

Mr. BOGOSIAN. Thank you. Actions at the Federal, state and local levels of government on our manufacturing policy recommendations will directly help the U.S. aerospace industry. Aerospace generates hundreds of thousands of high technology, high paying jobs and, as America's largest net exporter of manufactured goods, helping to address our trade imbalance by more than any other industry sector.

In 2003, the industry recorded a trade surplus of about \$27 billion. A strong aerospace industry is crucial to U.S. economic and national security and for continued technological innovation and advancement.

Europe is focused on military and civil aerospace strategies in its Vision 2020 report, the STAR-21 report and their six framework research programs. European governments have a direct financial interest in the well-being of their companies because they either own significant but decreasing shares of the companies, have contributed subsidiaries or have exposure through loans.

These practices do not exist in the United States and thereby create an imbalance in the competition between U.S. and European companies.

In the rotorcraft industry, the French-German Eurocopter and the Italian-British firm AgustaWestland are the world's first and third largest producers, respectively. Eurocopter, according to the company, captured 45 percent of new civil and military helicopters ordered globally in 2003, contrasting sharply with Bell, Sikorsky and Boeing, which captured only 14 percent, 10 percent and three percent respectively.

Eurocopter also claims to hold a 48 percent share of the U.S. civil helicopter market, which includes civil defense procurement. Many of the issues confronting the U.S. aerospace industry were addressed by the Aerospace Commission report that Mr. Shaffer referred to.

The Commerce Department is participating actively in the Administration's initiatives on issues identified by this report. We are working with the Federal Aviation Administration (FAA) in the area of modernizing the U.S. air traffic management system. And a number of offices in the Commerce Department are contributing economic and analytical expertise to that effort.

In the area of workforce development—and Mr. Chairman, I know you have taken a leadership role on this through the Congressional Caucus—Commerce is working with the Department of Labor and an industry committee to address the industry's needs in this area.

In the area of export licensing, Commerce is working with the Departments of Defense and State to balance national security and economic security needs and keep sensitive equipment out of the hands of terrorists and rogue nations, while strengthening trade ties with our allies.

In the area of aeronautical R&D, my staff is working with an interagency group to review federally funded R&D and facilitate its dissemination to the private sector. Commerce is most involved in

the concerns for free and fair trade in aerospace products. To an extent not seen in many industries, governments are a significant factor in the aerospace marketplace as customers and as stakeholders.

Roughly 72 percent of total U.S. aerospace industry output is procured by Federal, local and foreign governments. For many governments, including those of Europe, aerospace manufacturing is a strategic industry.

In terms of global markets, the governments of non-U.S. aerospace manufacturers intervene in the marketplace in various ways to support their domestic producers. This intervention can involve subsidies to produce new products, the creation of technical standards that favor domestic products, the offering of incentives to aircraft purchasers to boost the sale of domestic products and tax and export financing programs that assist their producers in reaching markets abroad.

Given these actions, the Commerce Department is focused on the critical issues impacting the competitiveness of our aerospace industry. Similarly, U.S. industry is challenged to work closely with the U.S. Government to help address issues that arise.

One of the key responsibilities to meet this challenge is monitoring foreign government policies and pursuing appropriate action to promote a strong U.S. aerospace industry. We are already working on a number of our manufacturing initiative policy recommendations, including negotiating the elimination of trade distorting subsidies, promoting global use of U.S. technical standards, reviewing dual-use export controls and developing a new Office of Investigations and Compliance and an Unfair Trade Practices Task Force to help enforce trade agreements and combat unfair trade practices.

These recommendations are contained in a report we released in January, "Manufacturing in America." It is available at manufacturing.gov. And it takes a holistic view on the challenges affecting all manufacturers and makes policy recommendations of steps that are highly critical to address manufacturers' needs.

We are taking the steps necessary to maintain the strength of the U.S. industry in global competition. Thank you. I look forward to the dialogue today and beyond.

[The prepared statement of Mr. Bogosian can be found in the Appendix on page 131.]

Mr. WELDON. Thank you, Mr. Bogosian.

Mr. Flater.

STATEMENT OF M.E. RHETT FLATER, EXECUTIVE DIRECTOR, AMERICAN HELICOPTER SOCIETY INTERNATIONAL

Mr. FLATER. Mr. Chairman, Mr. Abercrombie and members of the committee, my name is Rhett Flater. I am the Executive Director of the American Helicopter Society.

Since much of my testimony today relates to national defense, I would like to just add that I am a former Marine Corps aviator and a helicopter pilot. And I served in Vietnam during 1967 and 1968.

I am appearing today before you to discuss the state of the United States rotorcraft industrial base. But more specifically, I want to comment on the U.S. Army's recent decision to terminate

the Comanche and the impact that that decision is going to have on this industrial base.

Let me say first that ours is a relatively small industry. Bell Helicopter, Boeing Integrated Defense Systems and Sikorsky Aircraft's combined sales in 2003 were less than \$6.4 billion. They employ 25,000 people in or near Fort Worth, Texas, Philadelphia, Pennsylvania, Mesa, Arizona and Stratford and Bridgeport, Connecticut.

But in the terms of our industry's importance to this Nation's national security, I want to say upfront that helicopters, with the ability to take off and land vertically in remote environments, are critical assets in fighting asymmetric modern wars. And I would say that when the V-22 Osprey is introduced, that will be equally true of tiltrotor technology.

These are the only vehicles capable of providing a practical and affordable solution to military needs for utility transport, for cargo, for combat search and rescue, reconnaissance, surveillance and close-in attack. They are critical to 21st century military transformation efforts, which are focused on developing lighter and more mobile and more lethal and more agile military combat capabilities.

This industrial base consists of these primes that I just mentioned. But I would be remiss if I did not mention the engine companies that support us: GE Aircraft Engines up in Lynn, Massachusetts; Honeywell, formerly AlliedSignal, which is out in Phoenix; Rolls-Royce, formerly known as Allison, which is up in Indianapolis.

And suppliers: like Kaman Corporation, up in Bloomfield, Connecticut; Hamilton Sundstrand in Windsor Locks, Connecticut; Goodrich down at Charlotte, North Carolina; Lord Corporation, Erie, Pennsylvania; Smiths Industries in Grand Rapids.

And of course, then the big systems integrator houses that are so vital to our future since, to tell you the truth, more than 50 percent of the value of most helicopters these days are systems, a remarkable departure from the practice back when I was in Vietnam, where 95 percent of the content of my CH-46 Sea Knight Helicopter was actually the airframe and the engine. Today, it is more than 50 percent systems. So we depend on Lockheed Martin in Owego and Orlando and BAE Systems in Vermont and Northrop Grumman in Baltimore and Honeywell and others.

Let me go back in history just a short ways and tell you that during the 1960 to 1980 timeframe, some time ago, the United States government used to invest really large sums in basic rotorcraft research. And they did this through vehicles like the Army-NASA Joint Agreement on Rotorcraft Research Collaboration.

Investments in engine technology during the 1970's produced something called the T700 engine which powers the Black Hawk and the Apache. And this engine was so far ahead of its time that it gave the United States military medium lift capabilities unmatched by any other countries for many, many years.

And this is a very critical point in testimony today. The once strong technical base for rotorcraft declined during the 1990's as government investment dwindled. Now here is an example. And I have distributed a chart that I hope you have with you.

The Army's 1984 investment in aviation science and technology was \$251 million in 2004 dollars. Now 20 years later, when the

Army is every bit as needful of vertical takeoff and landing aircraft as it ever was back in 1984, that has declined to only \$115 million or more than 55 percent.

I would like to give you another example, a broader measurement of aviation expenditures. The Army RDT&E budget for aviation in 1984 was \$7.9 billion. In 2003, it had declined to \$2.3 billion or a factor of three.

Now with NASA's determination in 2002 not to invest further in rotorcraft R&D, government's total investment has been reduced by half. NASA has restored funding to the level of \$15 million in 2004, but this is a really small fraction of what it used to be.

Now I am not criticizing Sean O'Keefe or Fred Gregory or Dr. Vic Lebacqz. I think they are outstanding leaders over at NASA. They are doing the best they can. But their resources are just too limited.

Now compounding this problem is that NASA is in the process of closing really important infrastructure for the design and development of new aerospace products. I will give you an example. The National Full Scale Aerodynamics Complex, known as the NFAC, this is the 40x80 foot and the 80x120 foot subsonic wind tunnels located out at Moffett Field at Ames.

These were closed on May 16, 2003. We cannot get into them anymore.

And yet, we are wholly dependent in this industry on access to full scale testing. And so is the fixed wing industry.

In addition, this Nation's only crash safety complex down at Langley was closed September 30 of 2003. And so we have a scenario today where NASA, because of its serious financial problems, is locking down the very infrastructure that this entire aerospace industry must have in order to be competitive in world markets.

It is the same infrastructure that this industry needs to have to be responsible to you, Mr. Chairman, for your national security needs and your responsibilities.

Now I think this point has already been made by Mr. Bogosian, so I am going to move through it very quickly. But while the United States is reducing its investment in rotorcraft research and test and evaluation infrastructure, just the opposite is happening in other countries.

The European Union has doubled its investment in aeronautics. All that testimony is in my written testimony. I do not need to go through it in great detail.

But I would tell you that you have in Europe some pretty tough competition, really good companies: Eurocopter and AgustaWestland. And these companies are out there competing in world markets and making just gigantic investments in science and technology, in research and development.

And they are competing. And they are beginning to win contests against our products abroad.

And I am going to tell you, sir, that part of the reason is we are not making the infrastructure investments and we are not making the science and technology investments that these countries are making.

I think I have touched on this, so I will just mention it briefly, but the long-term cooperative efforts between NASA and the De-

partment of Defense in helicopter research, especially the 1969 Army—NASA joint agreement, these efforts are just in terrible turmoil right now.

If this trend is going to continue that we are seeing today, I think the United States Defense Department—and it pains me to say this—may eventually become dependent on non-U.S. suppliers for its future mobility requirements.

Now if that happens, I will be honest with you, the Department is probably going to get a pretty good product from Europe. But the jobs of more than 26,000 people at Bell, Boeing and Sikorsky, not to mention a greater number who work as subcontractors, are going to be at risk.

And there is no reason why, without a proper investment, we cannot be a world leader in this field. We have the core competencies. We have the history. We have the products in the field today.

I would like to just direct a couple of remarks to the termination of the Comanche and what that is going to do for us. This is a program, as you know, that was conceived about 20 years ago. And I will be honest with you too, it has been performing really well in recent tests.

But the Army has decided that we are dealing with a different world environment today. And maybe stealth and low observables are not quite so important as they used to be back in the 1980's.

And so it is also decided that they have to transform Army aviation and reinject some new life into it and move out pretty quickly. And the only way they are going to be able to do it is to cancel the Comanche.

This is a grievous blow to my industry. But let me tell you, my companies—Bell, Boeing, Sikorsky and the rest of the industrial base—stand arm-to-arm in lockstep with the Army on this decision. It is a very, very tough decision for all sides.

But they are doing the right thing. And we support what the Army is about to do.

Now we understand that, as part of the high level decision process that was made by the Army, including briefings to the President and the Defense Secretary, that the termination of the Comanche is going to enable the reallocation of the \$14.6 billion that was going to be spent for the Comanche into other Army aviation efforts thru the fiscal year 2004 and 2011 timeframe.

And these funds will be used to underwrite procurement of additional helicopters—Chinooks, Apaches, Black Hawks—the transitioning of some Comanche technologies like fly-by-wire and common cockpits—you know, this is good stuff—the purchase of some light utility aircraft that the Army badly needs and about 368 or so armed recon aircraft. These will be off-the-shelf procurements. I do not expect that they are going to be competed and researched and all that kind of thing.

Mr. ABERCROMBIE. I did not hear the last statement you made.

Mr. FLATER. These are going to probably be off-the-shelf procurements, Mr. Abercrombie. And by that, what I am trying to say is these are not going to be protracted acquisitions.

I suspect that the Army is going to call up the manufacturers and say, "What do you have that meets this requirement?" And

they are going to tender. And they will make a down-select based on that.

So whether this happens—and I am talking here about the reinvestment of the \$14.6 billion and the importance of that to Army aviation—whether it is allowed to happen in this very difficult election year will depend on the continued support of the Administration and the Department of Defense. But more important, it is going to depend on the will of this Congress.

And I am here to tell you today that the society strongly endorses the Army's plan. And it urges Congress to fence off the entire \$14.6 billion investment which would have been made in Comanche.

Let me just mention a statement made by my chairman, who is Dr. Robert G. Loewy down at Georgia Tech. He is the Dean of Aerospace Engineering there.

He wrote to me the other day and he said, "Rhett, if there are sound reasons for man in space as part of our program of exploration, there must be still more reasons for manned airborne systems, considering the limitless abilities of an enemy to adapt to whatever technologies we develop. Experienced warfighters know that flexibility and our ability to respond is always essential."

I just want to commend to you the editorial that appeared earlier this week in Aviation Week and Space Technology, where they said, "The decision to terminate Comanche is a high-stakes gamble on the Pentagon's part. And riding on the roll of the dice will be the future of the United States helicopter industry."

"While the Pentagon's plan calls for a slew of programs, most are upgrades or refurbishments. These alone will not provide the engineering challenge to keep a robust helicopter industry alive."

"The United States, in recent years, has shown little support for its helicopter industrial base. To minimize the risk to the investor base, a new development should be started quickly. And the Army needs an intra-theater transport to move future combat systems and equipment."

So looming on the horizon is a requirement for heavy lift, something that can carry the Future Combat System, something that can—

Mr. ABERCROMBIE. I am terribly sorry.

Mr. FLATER. Yes, sir?

Mr. ABERCROMBIE. You said the Army needs what kind of investment? I could not hear you.

Mr. FLATER. I apologize. The Army needs a very heavy lift transport that can carry this Future Combat System that the new Army is going to revolve around and depend upon. And we do not have a helicopter today, made in America, that can perform this task.

So this is looming out there. And that is another reason why I believe we should be making a significant investment in science and technology.

So our industry stands by you. We are responsive. We have can-do senior managers and proven management teams. And I think we are ready to respond to national security needs as they come along here.

A couple of recommendations: first, Congress and this committee should support the Army's plan to plan to redirect the approxi-

mately \$14.6 billion originally slated for Comanche to meet current and future Army transformation needs.

Second, the DOD and NASA should be directed to make further investments in basic research—6.1, 6.2, 6.3. Third, given the importance of transforming the U.S. military to become more mobile and more agile—a requirement in fighting 21st century wars—the DOD should fund private industry to design, develop and fly a series of innovative vertical take-off and landing (VTOL) prototype aircraft, possibly heavy lift.

And fourth, this committee should pay heed to implementing the recommendations of the Commission on the Future of the U.S. Aerospace Industry.

Mr. Chairman, Mr. Abercrombie, members of the committee, I really appreciate your permitting me to talk for so long and appreciate your attention this morning. Thank you very much, sir.

[The prepared statement of Mr. Flater can be found in the Appendix on page 87.]

Mr. WELDON. Thank you, Mr. Flater. We thank each of you for your statements. And as I said, they are all entered into the record.

We will begin with some questions. And I have a couple to start off.

First of all, I am not as optimistic as I thought I heard coming from our Administration witnesses. I tend to share the feelings of Mr. Flater. And I am gravely concerned.

I am gravely concerned because what had been an industrial base of four major helicopter manufacturers shrunk to three with Boeing's acquisition of McDonnell Douglas. And I am going to ask each of you to respond to this, your best guess.

My best guess is we are going to end up with two because the amount of funding for rotorcraft, both in the research and the acquisition area, is not enough to support three large companies. Now that is going to be a decision based on the business interests of those companies.

But I can tell you—and you all know this as well as I do, and certainly you do, Mr. Flater—that there has been significant discussion about a further shrinkage of our industrial base in this area.

And that is extremely troubling because that means more jobs that we lose in America. And I am going to guarantee you, Mr. Flater, that as the chairman of this subcommittee, one of my top priorities is to make sure that that money being saved from Comanche is not siphoned off for every other program under the sun.

And I can just see the saliva flowing out of the mouths of some people who see that as a bill payer for other priorities. And we have to make sure that that money, which has been allocated and we have been guaranteed further commitments as to what the specifics of that will be, that we are going to be looking at that extremely close.

A couple of questions. I guess, first of all for our friend, Mr. Shaffer, you mentioned that the agency is establishing, I believe, the commission that was called for in the report at this current time. Was that not your statement you made, "is establishing?" The S&T subcommittee is establishing?

Mr. SHAFFER. Under the National Science and Technology Commission, yes, sir.

Mr. WELDON. Right.

Mr. SHAFFER. Formally, the subcommittee is going to be under both the Committee on Homeland and National Security and Committee on Technology. The charter has been written. There has been a preliminary meeting of the principals on this particular committee.

It is just for science and technology. It is out of Dr. Jack Marburger's office in the Office of Science and Technology (OSTP). But there is the interagency or intergovernmental committee being formed to address the issues on aviation S&T.

Mr. WELDON. Why did it take 14 months to do this?

Mr. SHAFFER. Sir, I have no answer for that. I cannot tell you why it took 14 months.

Mr. WELDON. That is a question somebody has to answer.

Mr. SHAFFER. Sure.

Mr. WELDON. I mean, our industry is in peril right now. As someone who represents a district right next to a major manufacturer and has seen this, I mean, to wait 14 months while the pencil pushers decide to finally follow through on a recommendation that you are now agreeing needed to be done to me is a little bit ridiculous.

And I would hope you would take the message back that we are happy they are establishing that now. But where have we been for the last 1.5 years while the European community has been knocking our socks off and while we are getting closer and closer to the verge of having another rotorcraft or another aircraft manufacturer leave the shores of this country?

A question for Mr. Bogosian. You mentioned issues of ownership and subsidies and loans by the foreign governments.

What specifically are they? Because I can tell you I am a good friend of our allies. But I want to know the specifics of where the French and where the Germans are subsidizing. Whether it is AgustaWestland or whether it is Eurocopter, I want to know that.

Because if they are doing that unfairly, I want to go after them. But we cannot do it with just generalized statements—and I am not saying this at you personally—of ownership, subsidies and loans. What are those subsidies? And what are those loans?

And the Europeans have just taken market access against us for certain actions that we have not done—according to the World Trade Organization, if I am not mistaken—and actually have imposed some. Well, let's play the same game back with the Europeans. But we have to have the specifics so that we in Congress can respond. So can you clarify that a little bit more about exactly what are the European and other countries doing in this area to allow these companies to grow so dramatically?

Mr. BOGOSIAN. Sure. Taking a step back to your question, the fact that the European Union was being formed, I think, was an action-forcing for European countries to take a fresh look at all of their R&D expenditures and take a fresh look at what priorities did they have to set, in terms of their industry support, through the European Union.

So take the best of what the different member states have been doing, consolidate them and come up with a very strong, unified proposal—program—to help their aerospace industry. They did this back in January of 2000 with their Vision 2020 statement.

They set it out clearly. They said, “Our goal is to become the uncontested world leader in aeronautics by 2020.”

They followed up with the STAR-21 report, which is very similar to our Aerospace Commission report in its content. And then now they have announced the Sixth Framework, is what they call it, which proposes \$15 billion for European Commission-sponsored research activities during 2003 to 2006.

There is a shift away from funding specific projects toward supporting generic activities and a change in philosophy from the Fifth Framework, which emphasized economic and social returns, to the Sixth Framework, which again focuses on building a European research area.

So that is in terms of the institutional changes that they made and the goals that they set for themselves and the strategies to follow.

In the meantime, there are issues like \$4 billion of launch aid for the A-380. Now there is launch aid and we are also using our airport improvement monies to make the changes at our airports that support the A-380.

Right now, we are fighting the battle with Rolls-Royce because Rolls-Royce historically, in their development of engines, has received royalty-based loans from the British government. These are paid back based on the company's assessment of its royalties from the specific product development program that they got the loans for.

So right now, we are fighting on that front to say, “All right. We know the 77 competition is about to come up. And Boeing is going to have to make decisions for the 77. You have to stop giving these sweetheart government loans to a fully functioning, mature aerospace company.”

So at the Department of Commerce, what we noticed—what the Secretary noticed—was we came in and, I think, for about a little over 30 years, maybe 25 years, the focus on domestic competitiveness went away. There was a reorganization in the 1970's. There used to be a domestic industry office and an international industry office.

Somehow, along the way, that became the International Trade Administration. And therefore, the staff's mission at the Department of Commerce became: look at international trade barriers.

So what the Secretary asked is: well, what about competitiveness as a key challenge, which is a much bigger set than the subset of just international trade barriers. So with the reorganization that we are undertaking right now, which was appropriated for in the Omnibus Bill, we are creating offices like the Industry Analysis Office, which I think this is an office which could really help on the subjects that we are talking about today.

Business economists would staff that Industry Analysis Office. And they would basically cost out policy issues and regulatory issues.

They would provide a cost-benefit analysis so that if you are considering legislation and you want to know the impact on business between Option A versus Option B in writing that legislation, that office will be able to provide you the research you need to make your decisions.

Same thing with regulations. The Office of Management and Budget (OMB) in our report has been tasked to create an inventory of all existing regulations.

This is by way of: what can the U.S. Government do right now to take cost away? Our businesses, our manufacturers, tell us there is the international side of the ledger and there is the domestic side of the ledger.

Domestically, the government imposes costs on our manufacturers and makes them less competitive. So not only are they facing the challenges that they are facing from Europe with their research focus, but they are also facing challenges from us through rising health care costs, which is something that all manufacturers have really focused on, litigation costs, energy costs and regulatory costs.

So I think it is a very cohesive, holistic way that we have to approach the challenges that we are facing from Europe. There is the R&D side of the ledger. There is the international side of the ledger. And then there is the cost side of the ledger.

So we really have to focus on our manufacturers' needs.

Mr. WELDON. Well, first of all, it is rather shocking that we have not had this capability within Commerce to actually understand what the Europeans have been doing specifically to knock our socks off in some of these competitive situations. That is a shock to me that we have not already had that. And I appreciate the fact that that is being stood up now.

But I want to say, as someone who works closely with our allies and has supported their involvement in programs like Joint Strike Fighter, where the Brits and the Italians and the Australians have come up and wanted to get in early on. But as someone who advocates free trade, I am sick and tired of having the European community, through whatever means, both the upfront R&D and the subsidization through other means, make it impossible for our companies to compete.

I mean, I have even heard horror stories where the French will tell their military, "You cannot buy American products. You must buy French."

Well, we want to know about that. We want to know the specifics. Because if we know the specifics, then we will take action.

We do not have to play the game of kissing up to our European allies if they are unfairly making the playing field such that our companies in no way can compete. And that leads me, Mr. Flater, to your comments.

And in this area of research, I think administrations, both Democrat and Republican, both should be embarrassed because we have paid lip service to this issue. We cut the R&D 6.1 through 6.3 account lines by 25 percent all through the 1990's. And it has not gotten any better in the 2000s. And I do not care who is making the case.

It is like we have fought the battle. I am also on the Science Committee where, as you know, I am the second ranking Republican on the committee.

And we have fought the battle because NASA requested zero money—zero money—for research. Yet they have the mandate.

In fact, Mr. Flater, you are aware I proposed legislation to take it away from NASA. And only because Sean O'Keefe, being a decent, good guy went to the Army and said, "We will use \$15 million of your money."

But my staff support tells me that that is really not \$15 million. When you apply the overhead taxes of NASA, it comes out to about \$8 million.

What a joke. I mean, why aren't we being honest? We are not increasing the R&D investment in these areas. We are going the opposite way.

So we are losing on the R&D side. The Europeans are beating our socks off because they are making heavy investments in R&D and we are not doing beans about it in the next several years' budget. And I am going to ask you to respond, whether you agree or not.

And on the other side, we do not understand the subsidies they are providing. So our industries are losing all over the place.

No wonder they are doing joint ventures with Agusta. No wonder they are doing joint ventures with the Europeans. I would too.

If our government does not respond, go over there and join with them. You will get a better deal. You can benefit with their subsidies, benefit from their research and then come back and we will just do the high-tech stuff in America and no longer manufacture.

Mr. Flater, what are your observations?

Mr. ABERCROMBIE. Mr. Chairman, before he answers, I just want to assure Mr. Flater that I bet he is really glad that you are actually agreeing with him.

Mr. FLATER. I was just going to say, Mr. Abercrombie, to the chairman, I was going to say, "Mr. Chairman, you said it better than I can say it." And I endorse what you have said 100 percent.

Mr. ABERCROMBIE. I say that to him all the time, Mr. Flater. [Laughter.]

Mr. FLATER. But that was the substance of my testimony, Mr. Chairman. And I again want to point out, if you look at either NASA or the Army or the Department of Defense, we are dying for lack of investment in research and development.

The investment that was made in 1984—and I have given you those numbers—was about triple the investment that is being made today. And we wonder why we are losing our industrial base.

And what I am saying, I think that the Department of Defense and NASA, the Administration, Congress, this committee needs to take a close look at this issue. And Mr. Chairman, thank you for supporting this.

Mr. WELDON. Mr. Flater, do you envision that, if we continue on this trend, that there will be a further consolidation of the U.S. manufacturing base?

Mr. FLATER. Undoubtedly, this will inevitably happen. Now I am one of these people that have been saying for the last several years, there will probably be a contraction from three to two.

I was around when we went from five to four and four to three. And yet, I have been wrong. And frankly, the three major companies, they want to buy each other. I guess they are eternal optimists, perhaps.

But the real point is that this industry is not going to be competitive within 10 years if someone does not get out there and make the needed investments and if we do not save NASA's critical RDT&E infrastructure. If that happens, in 10 years, this industry will be severely marginalized in world markets.

And when you call them up over there at Bell, Boeing and Sikorsky and say, "Give us a hand. We need a new product," they are not going to be quite as responsive as they might otherwise be.

Thank you, Mr. Chairman.

Mr. WELDON. The thing we have to keep underscoring, this is not about free markets. This is not about being protectionist. We are not advocating that.

What we are saying is that when our companies are allowed to compete fairly, when their competitors in Europe are not allowed to subsidize unfairly—whether it is through loans or through special financing arrangements or governmental ownership, whatever it is—when our companies can compete, they can win.

But it is our government, the advocate of free and fair trade, that in the end is handicapping our very companies. And that is what has to stop because our companies cannot win in this situation. And the Europeans are going to continue to beat our socks off.

Mr. Abercrombie.

Mr. ABERCROMBIE. Thank you, Mr. Chairman. I continue to be very happy about the fact that I have never been or never will be a free trader. [Laughter.]

I want to say too to everybody that Mr. Weldon and myself are very intense a lot of times. I just want you to know it is never personal. It is relentless, but it is never personal.

To me, it is just globalization. Mr. Bogosian, I give you credit, you have a tough job, at least talking to me right now because I have no sympathy for you at all—again, not personally. I have lots of sympathy for you.

But what I mean by that is that you are not going to hear me complaining about what Europe is doing. Hell, they have a United Europe.

We keep telling them they have the United States of Europe now. They are putting all their stuff together. And they are going to try and do the best they can. I am not going to weep tears over that.

The question is what we do, not what they do. And as for whether the government invests or it does not invest, I mean, are we not going to take—in fact, Mr. Flater makes it very clear. By the way, I appreciate your testimony, Mr. Flater, in this.

Mr. Flater makes very clear in his testimony that we are—I believe you call it "migration" of Comanche technology is going to go into other helicopters, right? It is not as if we spent all this money on the Comanche and then we threw it in an ash heap someplace.

There are all kinds of technical aspects, from manufacturing aspects to actual individual technology advances that are transferable

or are able to be migrated to other helicopters. And we invested in that. That was the taxpayers' money.

And I do not think you are going to score many points, Mr. Bogosian, by saying that health care costs are causing us not to have better helicopter competition. I mean, the last time I looked, even the Europeans have universal health care. So I do not think we can reach into that one.

And if it is regulations, that is just a standard dodge. So I do not think we are going to score any points with ourselves or anybody else on that.

Nobody is going to weep any tears for the United States about unfair competition, particularly when you talk, at one point in your testimony, about strengthening our ties with our allies. I mean, you cannot have it both ways.

Now me, as I say, I am not a free trader; never have been. I do not know what the concept means. I have never seen it anywhere in the world. It certainly does not exist in the United States, except theoretically.

So in that context then, it seems to me what I would like to focus on then is what, in fact, are we going to do now? Let me explain it this way: has the Administration made a position?

And maybe Mr. Shaffer can answer this. Are we going to continue to have as a policy this—I guess it was synergy when it started, Mr. Chairman—but this collaboration between NASA and the Department of Defense? Or is the Department of Defense going to take over its own integrated—what I would call an integrated research, testing and procurement system?

Because if you are going to keep doing it with NASA, you are dreaming. I do not care whether Sean O'Keefe is a saint come to Earth. He has an institutional obligation to NASA. And their interests are antithetical to what you want to accomplish.

I want to be—what is the opposite of a free trader? I do not know. I am a troglodyte. I am looking at Charlie in the back of the room. He knows what I am. I am a troglodyte in this.

I think the Department of Defense ought to operate to advance the strategic interests of the United States. And you invest what needs to be invested, based on the judgment of the Congress, to advance that.

I do not see how you can have NASA and the Army, let alone the other services, do this. If you want to integrate in the services to do testing, like wind tunnels and so on, with the Air Force and the Army or whatever it is, and the Marines, vis-à-vis helicopters and that, that is okay because that is what we have the joint chiefs for.

I realize I have gone on at some length to try to establish that. But the reason is that the chairman has put forward a fundamental issue here as to whether or not we have to reorient what we do with respect to research and development in aid and assistance of advancing helicopter capacity in this country.

Before we ever get to the free trade idea, we have to decide: are we going to be able to build the helicopters and be able to do it in the first place? So is the Administration position that—and I was not quite sure, Mr. Shaffer, from your recommendations—is the Administration position to continue the existing arrangement be-

tween NASA and the Department of Defense with respect to these issues that have been elucidated so far?

Mr. SHAFFER. Yes, sir. Certainly for the short term, because of the infrastructure that has been built up at the three NASA facilities.

Mr. ABERCROMBIE. Why can't we transfer them to the DOD?

Mr. SHAFFER. I have not seen the full up costing. But the estimate is to regenerate or recreate those test facilities on DOD locations——

Mr. ABERCROMBIE. Excuse me, Mr. Shaffer. You mentioned the word "regenerate" because they are closed?

Mr. SHAFFER. They are closed or they are not—large wind tunnels are not something that you can just pick up and move. So we would have to build a new wind tunnel at another location.

Mr. ABERCROMBIE. Why?

Mr. SHAFFER. The estimate——

Mr. ABERCROMBIE. Wait, wait, wait, wait.

Mr. SHAFFER. Yes, sir?

Mr. ABERCROMBIE. Help me. Help me here. Why? Why would I have to transfer them? Just transfer who owns them?

Mr. SHAFFER. Okay. That is a different issue. I thought you were asking should the Department of Defense take the mission and move it. The other estimates of cost, if we were to lease the NASA facilities, the estimates would cost around the order of \$55 to \$60 million a year just to operate those particular facilities.

Mr. ABERCROMBIE. We have \$400 billion in the Defense Department.

Mr. SHAFFER. Yes, sir. Yes, sir. And that is something, there was an agreement last, I believe it was April, between General Kern, the commander of Army Materiel Command, and NASA to leave the current facilities open, to use it and then to come up with a plan of action how we are going to deal with the NASA unilateral action to close.

It will take some shifting and some reallocation of resources. There is no doubt, from a research and science and technology perspective, that we need the large wind tunnel.

NASA Ames does have the only full scale wind tunnel in the Nation. It is a special wind tunnel that has special properties for rotorcraft. That is something the Department absolutely needs as part of its overall research and development program for the future of rotorcraft.

I cannot tell you how we are going to get there. But we do recognize the fact that we have to have it.

We have a 20-plus year agreement with NASA. We would like NASA to honor that commitment. But one way or the other, I do not see the future of military rotorcraft going forward without a full scale wind tunnel.

Mr. ABERCROMBIE. Well, you have been kind on this time, Mr. Chairman, just a moment or two. You heard my opening statement, Mr. Shaffer—and maybe Mr. Bogosian too, but probably less, it is less in your area—but what about now?

And you have mentioned this yourself. Because of the Comanche closing and we have this question of the V-XX or I ought to call it Marine One, can you give assurances here on the record now

that we are not going to change our procurement policies with respect to standards and so on?

I know there is a lot of emotion involved in this. There is a lot of anxiety as to who is going to get the contracts and how they are going to work and all the rest of it.

If we follow what Mr. Flater spoke of and what the chairman has indicated is his—and I assure you is my—desire as well to fence off this money or do what needs to be done to make sure that the money does not migrate like some of the technology. That does not obviate, in my judgment, the necessity then of applying standards with respect to the decisionmaking as to who gets what contracts, if we take the politics out of it.

Mr. SHAFFER. Yes, sir. You asked if I could guarantee with assurances. What I would like to do is tell you—

Mr. ABERCROMBIE. A guarantee, I do not ask you to do that.

Mr. SHAFFER. Yes, sir. Yes, sir. What I would like to do is tell you the direction from Acting Under Secretary Wynne to the decision to terminate the Comanche. Secretary Wynne told the Army that they had to come back within 90 days to provide an implementation plan for the overall Army aviation modernization.

Now that is a very important date because that is from the time of that letter to the time that the Army has to report their modernization plan. That gives us time to make sure that the budgets are aligned and we do have the proper research and development and balanced program within the Army and the department for the 2006 budget submission, in addition to the 2005 budget amendment.

So I think it is very important that Secretary Wynne has directed the Army to come back with a plan—a detailed plan—for overall aviation modernization. And as far as the details of that plan, I think the Army is still working that out. General Thurman is on the second panel. He may be able to address it.

Mr. ABERCROMBIE. In other words, just for the record now, what you are saying is that—and I made a reference specifically to V-XX because I think that is a case in point. I could name others. In fact, Mr. Flater has named a whole series of things in his testimony that needs to be addressed.

You are going to apply the same standards. You are going to pick the best helicopters. You are not necessarily going to say we have to take care of somebody. It is going to be tempting.

Mr. SHAFFER. Yes, sir. Yes, sir. And I want to be careful because—

Mr. ABERCROMBIE. Yes, you do.

Mr. SHAFFER. Yes. Yes. The Department absolutely is committed to getting the very best technology out into the hands of the warfighter. But the overall Army aviation modernization plan will include some of the modernization of the current fleet, to include force protection of the current aviation fleet.

Mr. ABERCROMBIE. And I will finish with this. Excuse me, Mr. Chairman. You have been very kind. And I apologize to the other Members on this.

You see, if you would have said to me, "We are going to make sure that an American company gets this and there is going to be

competition. We will make our investments and so on and so forth," you would not hurt my feelings.

But if we are talking about getting the best—and let me tell you, the Europeans are building a better helicopter—then you are going to have to deal with it, regardless of the reasons why they are doing it. Now I do not think that is the case. I think we can do that here.

In fact, I am a little worried that we may be getting—I want to make sure that the companies that you may be dealing with in the United States are not necessarily going to get a contract and the next thing I see happening is that they have done a little bit of this transfer technology and a little bit of this outsourcing and a little bit of this globalization and free trade operation. And all of a sudden, we are building these things in Europe.

And as you said, Mr. Bogosian, they have health care over there. Even despite that, they may want to build it over there anyway.

I want to see it built in the United States. And I want to see the competition within the United States go to the company that has the best helicopter. And if we have to invest our funds in that, I would like to see that happen.

That is the reason I am asking the question. I am really concerned that we are going to end up doing this. And the next thing, we see it being built in Europe.

Mr. SHAFFER. I understand the question. And the commitment from the Department S&T program is to deliver the best possible technologies from our laboratories, from our product centers, to protect our young forces that we put out in the field.

Mr. ABERCROMBIE. Thank you very much.

Mr. SHAFFER. Yes, sir.

Mr. ABERCROMBIE. Thank you, Mr. Chairman. Thank the other Members.

Mr. WELDON. Thank you.

Mr. Israel.

Mr. ISRAEL. Thank you, Mr. Chairman. I would like to pick up on what the chairman and the ranking member have been addressing with respect to level playing fields and competitive disadvantages. And sometimes it works the other way.

One of the findings of the Commission on the Future of the U.S. Aerospace Industry was that we should be reviewing export licensing processes and technology transfer restrictions. I was in India early in January. And there is obviously an acute anxiety in our country about outsourcing.

And the Indian officials that we met with were very defensive about outsourcing. But one of the things that the Indian defense minister said to us was that they would love to be able to do business with America's defense industry.

Right now, they are buying 70 percent of their defense products and technologies from Russia, which may be appropriate. But they said that they would love to explore co-production opportunities with the United States, would love to consider procuring from the U.S.

Only—in their words, not mine, in their words—antiquated technology transfer restrictions and export license restrictions prevent

them from doing that. So let me just throw out this jump ball. And any one of you can answer.

Do they make a point? Should we be reviewing some of those export restrictions, technology transfers, to help the U.S. aerospace industry find new markets, including markets in India, which we all know is now the world's largest democracy and, as I said before, is procuring 70 percent of its defense technologies from Russia?

Mr. WELDON. Will the gentleman yield on that?

Mr. ISRAEL. I would love to.

Mr. WELDON. Because that is an excellent question. And I would add, Mr. Bogosian, to the question of the gentleman, specifically talk about Boeing's attempt to sell Chinooks to China for the last 10 years and what you are doing about that.

You want to talk about free and fair? We have the largest imbalance of trade with China. Yet China wants to buy these aircraft.

And yet, my understanding is we are not selling them to them. So that adds to what the gentleman is saying. So talk about that also.

Mr. BOGOSIAN. Sure. I just want to assure everyone that there are recommendations in the manufacturing report beyond health care. And one of them is about export controls.

This is a very important issue. And the Commerce Department really gets crossed wires sometimes because it is seen as, well, you must be the one just focusing on the commercial interests and you could care less about national security. That is not so.

We work with our companies to make sure we understand exactly what their problems are with regard to export licensing. If there is export licenses that are just taking far too long for the nature of the license application into the State Department, let's say, we will work with our State Department colleagues and make sure that they understand what the company's intent is and try to help the company and the State Department come to some sort of understanding so that the export licensing process could be less burdensome than it could be.

We have all heard about nightmare stories about the same company putting in an export license request into the State Department. Somehow, it gets lost in the paperwork, so they have to put in a second request. And the two requests come back out with different answers.

We are working right now on this issue. We are working with our companies. We are working with the State Department and within Bureau of Industry and Security (BIS) in terms of dual-use technology, in order to make sure that—how do we meet the economic interests while balancing the national security interests?

It is a challenge we do have each and every day. And we try to do our best in terms of how can we help all the parties understand and get through the process with less pain than they otherwise do.

Mr. ISRAEL. Other than the occasional bureaucratic foul-up or red tape that may not be necessary, is anyone taking a look and reviewing all of the different export controls and licensing restrictions that were formulated in a different era and relations between the United States and India and trying to figure out what may not be necessary anymore?

And second, if you would respond specifically to the chairman's question about China.

Mr. BOGOSIAN. With regard to your question, Mr. Israel, I would like to follow up with you after this hearing and discuss with you further on this issue.

Mr. Chairman, I am sorry, if you could—

Mr. WELDON. Well, it gets to the heart of what Mr. Israel is saying, and that is that we want to have free and fair competition. We complain about the subsidies of other governments in producing similar products that we cannot compete with.

But there is another fact here and that is the ability of our companies to sell technology overseas. Now I sat on the Cox Committee that for seven months looked at technology that we sent to China.

And you want to see something that will blow your socks off, it was everything from state separation technology to Bernard Schwartz's Loral technology, we gave the Chinese. But we cannot sell them helicopters because the Commerce Department says it is a sensitive technology.

Well, cut me a break. The high-speed supercomputers we sold to China are at their military research facilities designing miniature nukes. If that is not sensitive, I do not know what is.

So you are stopping helicopters. But back in the 1990's, we sold high end supercomputers. And we sold and transferred state separation technology.

The whole basis of the Cox Committee was to look at the specific technologies that we—the Commerce and the State Department—gave to the Chinese that damaged our security. The vote was nine to zero that technology that we gave to China was not stolen; it was given to them.

And yet we have a product like helicopters that is still on the munitions list, that we sell to companies that the Boeing Company cannot sell to China. What is the reason why that still is languishing, while Boeing cannot compete in the marketplace because of these other subsidies from overseas, yet they cannot get into a marketplace where maybe they can legitimately sell helicopters?

Mr. Flater, you may want to add to this.

Mr. BOGOSIAN. Mr. Chairman, this is a very important issue that we are working on and I would very much like to meet with the committee afterwards discuss.

Mr. WELDON. Is it classified?

Mr. BOGOSIAN. Yes.

Mr. WELDON. Rhett, do you want to add to this?

Mr. FLATER. I just want to emphasize that the point that Mr. Israel is making—that you, Mr. Chairman, are making—is a very important point to our industry. We are inhibited from selling to many markets overseas.

I know of a shipment of Sikorsky Aircraft that went to China many years ago that are shut down. They were there in China for search and rescue purposes for the Chinese people, to work their mountains, their hot, heavy, high kind of search and rescue requirements.

Those aircraft are shut down. Sikorsky could not legally ship any parts or support to them.

So yes, Mr. Chairman and Mr. Israel, we are indeed denied markets because of the nature of our export licensing requirements that I believe are creatures of another era, perhaps. And I do endorse your suggestion that the government take a second look.

Mr. WELDON. None of us want to sell sensitive technology overseas. We debated whether to sell Aegis technology to the Japanese. And we did it under a very tightly controlled process so they would not have the end capability of that.

I cannot for the life of me understand why we cannot sell helicopters. It just defies my—and this has been going on for years.

Mr. Israel, you raised a very valid point. Do you have some other points you want to raise?

The gentleman from Connecticut is recognized, Mr. Larson.

Mr. LARSON. Thank you very much, Mr. Chairman and Congressman Abercrombie, for this hearing. Let me say that I completely embrace and share the comments of our chair and ranking Member.

And I have enormous respect for our chairman, who has been the salient voice on this committee and throughout the Congress with respect to serving both on the Science and Armed Services Committee and his almost myopic focus on the industrial base, especially as it relates to aerospace, here in this Nation and the lack of funding therein. And also, his passion and understanding of just how vitally important these core industries are to this country, not only from a national security point, but from a humanistic standpoint, in terms of the jobs and technological know-how that are being, in fact, lost and, in many respects, as is the case I think that is before us today, perhaps lost forever if we do not right this ship and turn it around soon.

Mr. ABERCROMBIE. Mr. Chairman, would the gentleman yield for a moment?

Mr. WELDON. Sure.

Mr. ABERCROMBIE. I just wanted to indicate that you will notice that, again and again, the only time you get complimented as chairman, it generally comes from the Democratic side.

Mr. WELDON. I am in deep trouble then, I guess. [Laughter.]

No, you are my good friends. And I appreciate those comments.

Mr. LARSON. The people that are in deep trouble are the ones that do not heed his advice. And unfortunately, in that case, it means that it is the American worker that ultimately suffers.

And we could debate ad infinitum the ramifications of globalization, but it seems pretty clear to me as someone who has served on both science and armed services over the last six years, that while the efforts with respect to globalization and free trade may be noble, we are running headlong into nationalism.

And the nationalistic tendencies of the European Union and all the other countries that we face do not square with the United States Congress. That is why this committee, through its chairman, Duncan Hunter, is also focused on a "Buy American" initiative.

And in many respects, I can understand and see how that flies in the face of commerce and free trade. But truly, back in our districts—and Mr. Flater mentioned Sikorsky. He mentioned Kaman. He mentioned Hamilton Standard.

And add to that the numerous small businesses that those once-large companies outsourced initially in their own states and across this Nation. And now those small companies see being outsourced further abroad.

Now people call that globalization. In my district, they call it a pink slip. It is unemployment.

And this chairman will fight with his dying breath to make sure that this money is fenced off, to make sure that this money does not get gobbled up. But my experience also has been, in this committee, with that kind of money available and with other interests that exist, even in spite of his best efforts, by the time this gets to the conference committee, that money will be gone.

And yes, Mr. Flater, you said that everybody was supportive and locked arms behind the Army with regard to the Comanche because it was the right thing to do. Let me tell you from my perspective, the silence is deafening.

Would it be that they were also going to lock their arms together to make sure that that amount of money gets fenced off and then is appropriately invested in next generation development, American-made, American-engineered, with American labor. You know, I could lock arms with them on that fact.

But I have been around here only a short time, but long enough to know the reality of what is going on here. And the silence is deafening because when your largest customer tells you, "This is the way it is," that is the way it is.

So now we face this problem with our industrial base, our manufacturing base. And what troubles me deeply is that in 90 days, I will be waiting with breathless anticipation for everyone to be locking arms about the investment that is going to take place in American-made, American manufactured and American engineered rotorcraft and investing back in this industry.

Somehow, however, I am a little suspicious. I am little suspicious because I have already heard of the calls going in—and as Mr. Weldon pointed out—from our valued allies talking about their needs and their overarching concerns in this global economy and how we need to reach out and make sure that we continue to have valued allies across the world.

And while they value their workforce and will deny in competitive situations American companies from going forward, we stand silent over here in this country. Well, this is one committee that will not sleep.

And we have the voice of an ardent and strong chairman of this subcommittee and the chairman of this committee. And all of us will be locking arms around this issue and watching, so that we can further prevent the outsourcing of American jobs overseas.

I wish I could lock arms with you, Mr. Flater, and all the others. But there are no assurances—but I would like to hear them—that in 90 days, that we will be seeing a proposal emanating from the Army that focuses on the next generation, the next large sum of money in research and development that all of you have so eloquently said is needed.

And where will it go? And as Mr. Abercrombie said, how will it be competed? And who ultimately will receive that money?

Care to respond? I am happy to hear it.

Mr. FLATER. I share your view entirely. My customer has made a very tough choice, Mr. Larson. And it is my job to support my customer.

And the reason I am here today is I am frightened to death about this \$14.6 billion. And I think you are making my point. We have to fence this money off somehow or this industry is going to not be responsive the next time you call.

Mr. WELDON. Will the gentleman yield?

Mr. LARSON. Yes.

Mr. WELDON. The Army is going to be appearing on the next panel. So you will have a chance to put that question as to when and how exactly we can expect to see a total and complete delineation of those dollars.

Mr. LARSON. And minimally, as well, from the Department of Commerce, I would like to see, you know, we are always concerned about the companies—rightfully so. What about the displaced worker? What about that core competency that, once gone, we cannot replace?

They can replace it over in Europe because they are reinvesting there and they are keeping that core competency there, because their Vision 2020, as you point out, is to be globally dominant. And they recognize that when you are wed to quarterly returns and shareholder satisfaction here in this country, unless this government steps up and makes the investment, it is not going to happen.

Mr. WELDON. I thank the distinguished gentleman.

Mr. Abercrombie.

Mr. ABERCROMBIE. Could I just have a follow-up question on that?

Mr. WELDON. Sure, if Mr. Turner agrees.

Mr. ABERCROMBIE. This is such an important question. And I am sorry, Mr. Bogosian, but I think it kind of falls on you more than on Mr. Shaffer on this question.

What is the Administration's policy? Because after all, the Army is still going to reflect the Secretary of Defense and the Secretary of Defense is going to reflect the Administration policy.

Whatever plan comes forward here, can we have an assurance on the record here now that it is going to go to American companies that are not going to ship the jobs overseas with respect to whatever development takes place or whatever procurement game plan comes forward? Because you are going to have a tough time keeping \$14.6 billion if any member here thinks that that money is going to migrate to jobs overseas.

I am talking about companies in this country producing helicopters shifting jobs or purchases or procurement overseas.

Mr. BOGOSIAN. What I would like to do, Mr. Abercrombie, is, if I could, make sure that I answer your question precisely. So if I can—

Mr. ABERCROMBIE. Fair enough. Appreciate that. But I would like to have an answer on the record on that, Mr. Chairman, because our decisions are going to be made down the line.

Mr. WELDON. I agree.

Mr. ABERCROMBIE. Thank you. I appreciate that.

Mr. WELDON. Mr. Turner.

Mr. TURNER OF TEXAS. Thank you, Mr. Chairman. And I want to commend the chairman. I was here for your opening remarks where you gave your report on your visit to Libya. And I want to say—and I think every Member of the House shares this sentiment—and that is we have the greatest respect and regard for the efforts that you have made, Mr. Chairman, over the years in reaching out to some of the most critical and sensitive parts of the world.

I had the opportunity to go with you a few years ago to Russia on what was my first trip, but was one of many that you have taken over the years. Your interest in trying to reach out and deal with the sensitive problem in North Korea and now Libya reflects the continuation of the kind of leadership that I think all of us respect and that the American people greatly appreciate.

Mr. WELDON. I thank you very much for those comments.

Mr. TURNER OF TEXAS. I think I share the concerns that have been expressed here. But it is a very complex issue to deal with. And I think what we need to do is not only commit our resources to advance research and development to protect the rotorcraft industry in our own country and our own industrial base, but we also have to be sure that we provide the kind of tax incentives to be sure that we keep as many jobs at home as we can.

But I do not think we can fool ourselves into thinking that it is ever going to be a perfect world or that one company or another has an advantage with regard to making investments in our country. Because we are dealing with all of our major suppliers—whether it is Sikorsky or Bell or Boeing or any other that may be out there—with multinational corporations who have multinational interests who are, in fact, hoping to make sales multinationally. And so it is a very difficult and complex process, which I think causes us to be sure that we reaffirm our commitment to the established acquisition process that we have.

You know, for example, when we look at our balance of trade on military hardware with countries like Italy, we know that we sell a whole lot to Italy and to the United Kingdom. So in many ways, these international participants, by them having a role in some of these projects, provide a source of purchases that these companies that we want to preserve would not otherwise have.

So I do think that we need to look very hard at continuing our investment in this field and our commitment and our appropriations. But I also know that we have to maintain, in all of our purchases, a clear commitment to a fair acquisition process that ensures that we get the very best product at the best price for the American taxpayer.

But Mr. Chairman, I think that rather than ask a question, I will wait perhaps until the next panel.

Mr. WELDON. I thank the distinguished gentleman. I do not want to prolong this, but I have to do a quick follow-up.

Mr. Bogosian, I cannot let the Department of Commerce off the hook here. Your answer on the sale of helicopters to China was, "It is a classified issue." And I will let you get off the hook, but I am going to tell you that is not the answer.

The reason why the sale of helicopters to China was cancelled was because of Tiananmen Square. That was in 1989. When the sale was going forward and the Department of Commerce decided,

because of Tienanmen Square, they would stop the sale of helicopters.

That was not over a classified issue. Now we can blame the Clinton Administration for not changing in the 1990's. We are not dealing with the Clinton Administration. Why have we not dealt with that issue?

If it is a security issue or intelligence issue, separate from what it was in Tienanmen Square, then we ought to tell the manufacturers, "You have to take out this capability or that capability and then sell it overseas."

But to say and hide here and say, "Well, it is a classified issue," that was not the reason that sale was denied in the first place.

Mr. BOGOSIAN. Right. Mr. Chairman, when I said classified I was talking about in terms of more to the question that Mr. Israel was asking, not to your question. I am sorry.

Mr. WELDON. I am asking about the helicopters to China. And I think it is outrageous that we still in Commerce have not dealt with this issue. It was cancelled because of Tienanmen Square. That is long since over.

If there is another reason, tell us what it is.

Mr. BOGOSIAN. I will be sure that BIS—the Bureau of Industry and Security—gets you an answer because it is their jurisdiction. That is what they handle.

Mr. WELDON. Mr. Shaffer, do you agree with Rhett Flater's numbers that the 6.1 through 6.3 accounts have been decreased dramatically over the past decade and continue to go down today?

Mr. SHAFFER. Mr. Chairman, I cannot verify or vouch for his numbers going back to 1984. I would like to get with Mr. Flater and understand where his numbers come from.

Mr. WELDON. Would you give us, for the record, a summary of all S&T aviation accounts, just in the last 4 years since 2000, and what the trend has been? And Rhett, would you interact with the Administration on those numbers? Do you have them available for all accounts?

Mr. FLATER. I have actually the numbers from an Army aviation budget dating back to 1984. And I have used the normal factor to bring them up into 2004 dollars.

Mr. WELDON. I have that. But you did not go beyond the Army?

Mr. FLATER. Yes, sir.

Mr. SHAFFER. Sir? Mr. Chairman, I do have, as a matter of fact, the numbers as taken from the Defense Technology Area Plan. This is how we go ahead and make sure that we do not have unintended redundancies in the S&T program.

In 2002, the department-wide request—in just 6.2 and 6.3 dollars; 6.1 does not vary all that much—for air platforms was \$443 million. In 2005, that same request is \$691 million.

Mr. WELDON. In research?

Mr. SHAFFER. In science and technology. Yes, sir. That is 6.2 and 6.3 accounts. Within the air platform area, the two sectors that have grown that much or have grown the most in that period—and this is only for a four-year snapshot—were in fact rotorcraft and high speed propulsion.

Now I will say that the rotorcraft technology S&T investment was a little down in 2002. But overall, the rotorcraft investment for science and technology over the past three to 4 years has come up.

And in fact, in just the Army, their investment in science and technology in the 2003 budget request was \$70 million. In the 2005 budget request, it is about \$112 million. So the Army has increased.

The Defense Advanced Research Projects Agency (DARPA) has matched a lot of the increase in the Army for two demonstrations—the A-160 Hummingbird and the UCAR, Unmanned Combat Aviation Rotorcraft.

Mr. WELDON. So you are including unmanned aerial vehicles (UAVs) in that?

Mr. SHAFFER. I include rotorcraft UAVs. Yes, sir. But they are still rotary wing platforms. They can hover.

Mr. WELDON. We are going to have a hearing on UAVs in two weeks. But you include that in your number.

Mr. SHAFFER. But they are rotorcraft aircraft, sir.

Mr. WELDON. No, I agree with that. I have trouble with those numbers. Maybe I am wrong and maybe what I have been hearing is all wrong.

What is your response?

Mr. FLATER. I think I stand by my numbers. And I believe that in recent years, there has been a significant additional investment in rotary wing and fixed wing unmanned aerial vehicles that has crowded out significant investments for manned rotary wing vehicles.

Mr. WELDON. So then what we need to do—

Mr. FLATER. There is a significant difference between—

Mr. WELDON. What we need to do is separate out—and I agree with that point—manned rotorcraft versus UAVs because the focus of this hearing is primarily on manned rotorcraft platforms. We will do a separate hearing on UAVs. And to mix the two together and try to take credit for something that really is not addressing what we are talking about, in terms of the industrial base, is a little—it is not a distortion, but it does not really get at the issue that we are trying to get at, which is what is happening to our rotorcraft, manned rotorcraft industrial base.

So I would appreciate those figures. And I would like you to look at them when they are submitted so we can have the benefit of your analysis.

I mean, that is clearly not the impression. After seeing what National Aeronautics and Space Administration (NASA) has done and the way that we had to force, both in this committee and the Science Committee, NASA to put any money at all in, which in the end came from the Army. It did not come out of NASA's hide.

In fact, I still would ask you the question, Rhett. Do you think we should move that function away from NASA or leave it there?

Mr. FLATER. Well, I think there is a proposal on the table under discussion between NASA and the Department of Defense. And that is: should we lease these facilities to the Department of Defense—specifically to the Army in this case—for a dollar a year and just have the Army support these facilities? Man them, do whatever it takes.

Now the price tag that I have that industry is working on is the annual cost of maintaining the National Full Scale Aerodynamic Complex, the 40x80, 80x120 tunnels that we need so desperately, is between \$12 million and \$15 million. And that supports one shift—not two, not three—one shift. But that is adequate.

Now that number that I have just given you does not include any upgrades. Quite frankly, we would like to see the facilities upgraded. They have not been maintained adequately.

And so there might have to be an additional investment at some level to upgrade the facilities. But at this point, we would just like to get our individual blade control Sikorsky aircraft back in the tunnel with its smart surfaces so we can develop IBC and improve payload and performance capabilities. And we had to pull that capability out of the wind tunnel on May the 16th. And it sits now in a warehouse.

This is a revolutionary device. I do not speak about it in public very much. But it is the kind of investment we should be making. And we cannot make this investment without access to the facilities.

So I encourage the DOD to speak with NASA and see if some accommodation can be reached. Because frankly, the facility will be—it is closed as of now. But as of mid-May, we understand, they will begin laying off, terminating, mothballing this facility in such a manner that it would cost prohibitive amounts to restore it.

So we have about a 60-day window right now. After that, I do not think it is possible.

Mr. WELDON. Well, I thank all three of you for coming. And you certainly can see the concern that we on this committee have on both sides. And despite all the comments about study groups and science and technology (S&T) efforts, I do not believe that a new rotorcraft will result unless there is a well-funded, focused development program for our future rotorcraft.

I do not see that here. We will ask the next panel if it exists and, if it does, where it is.

But we want to thank you and just let you know that we will be watching this issue closely.

Mr. ABERCROMBIE. Mr. Chairman? Mr. Chairman?

Mr. WELDON. My friend, Mr. Abercrombie.

Mr. ABERCROMBIE. Just may I say, with regard to the last commentary, in my judgment, this amounts to the rotorcraft equivalent of base closing. You mothball this stuff; it is base closing.

And then all of a sudden, we are back in a position like we are with so many other bases, that you have to reopen them. And it is going to cost you plenty.

Mr. FLATER. You know what is very interesting, Mr. Abercrombie? I have done some research on this issue. And in fact, the current Code of Federal Regulations requires NASA to maintain the 40x80 as a national aerospace facility and make it available to other government agencies for government work free of charge.

And the reference I am making to is to 14CFR1210.1, Introduction.

Mr. ABERCROMBIE. They do it with vehicles. They do it with trucks. I do not see why we cannot do it with this.

Even if they want a dollar. I do not know, maybe the laws, Mr. Chairman—we do not need to pursue it right now. But you know you have my support on this issue of transfer.

Maybe we actually have to do a lease, I do not know. But actually, I do not know why. If they are not going to use it, they can just give it to the next agency in line that wants it, I think. But there is no reason why we cannot pursue this one way or the other.

I appreciate all the time, Mr. Chairman.

Mr. WELDON. My pleasure.

Thank all three of you for coming and for your service to the country. We deeply appreciate that.

With that, we conclude our testimony for the first panel. And will the Army and the Department of the Navy witnesses please be seated for our second panel?

Thank you all for being here. We appreciate you coming before us. And we will start with General Thurman. Will you proceed with your testimony?

STATEMENT OF MAJ. GEN. JAMES D. THURMAN, USA, DIRECTOR, ARMY AVIATION TASK FORCE; TOM LAUX, PROGRAM EXECUTIVE OFFICER, (AIR ANTI-SUBMARINE WARFARE, ASSAULT AND SPECIAL MISSIONS) DEPARTMENT OF THE NAVY; REAR ADM. ANDY WINNS, USN, DEPUTY N78 AVIATION REQUIREMENTS FOR HELICOPTERS, UNITED STATES NAVY AND BRIG. GEN. SAMUEL T. HELLAND, USMC, ASSISTANT DEPUTY COMMANDANT FOR AVIATION, UNITED STATES MARINE CORPS

General THURMAN. Chairman Weldon, Congressman Abercrombie, distinguished members of the committee, I appreciate the opportunity to appear and provide an update on Army aviation in recent operations and how we intend to continue meeting current operational challenges, as well as prepare for future ones. We are witnessing historic times in our Army and our aviation force.

As the recent Iraqi Freedom operations officer for the combined forces land component commander (CFLCC) for the decisive combat phase, I can testify that our Army in general and specifically our aviation leaders and soldiers in both the active and reserve components are well-trained, reliable, and ready.

I would like to begin by thanking the committee for your resolute support, concern and faith in America's sons and daughters serving our Army and our Nation. I believe you can all and would agree that while aviation hardware and other systems can become vital business decisions, our most precious and irreplaceable assets are the great Americans operating and repairing them.

Last September, the Chief of Staff of the Army, General Schoomaker, appointed me to lead a select group of aviation professionals from across our Army in a top-to-bottom review of Army aviation. The Chief of Staff of the Army's guidance was to make Army aviation a capabilities-based maneuver arm optimized for the joint fight with a shortened logistics tail.

I am pleased to report that the initial task force efforts have far exceeded expectations. A total of 123 recommendations were compiled. And we are aggressively working on an implementation strategy, synchronized with the Army campaign plan.

The statement I provided for the record today is a description of the state of our aviation force and the lessons learned from current operations. I also provide an overview of some key initiatives the Army will implement to prepare the force for ongoing responsibilities to respond to the changing strategic environment.

The pace of aviation transformation is relative to the rest of the Army so we can simultaneously increase aviation capabilities, institute modularity and provide flexibility to the joint and combined arms team. With continuing lessons learned from our ongoing combat operations, we have reaffirmed that the Army is inherently an air-ground force.

Today's Army is the best land maneuver force in history. And let me stress that it has the best aviation units in the world, thanks to the dedication and hard work of outstanding commanders and soldiers who are accomplishing that mission.

We owe them the very best equipment. Army aviation currently has nearly 450 active and reserve component aircraft deployed in Bosnia, Afghanistan and Iraq. In addition to these deployed aircraft, the Army is currently expending approximately \$1.6 billion in fiscal year 2004 to clean, inspect, replace parts and repair crash battle damage of over 1,000 airframes, as well as aviation support equipment and air traffic control systems from previous rotations.

Combined, nearly 60 percent of the Army's tactical aircraft fleet is currently either in a reset stat or deployed. While deployed for the war in Iraq, I developed some impressions I would like to share with you.

The bottom line on these impressions is that we must be ready when called. And there may not be time to train up before we go.

Therefore, we need to have trained, standardized modular units that are more combined arms capable and interoperable with joint forces that are capable of operating in an expeditionary manner. We need to optimize our reserve component capabilities to perform not only the combat tasks, but also those critical homeland defense tasks.

Our aviation leaders and troopers performed admirably, adjusting to rapidly changing situations, as well as several task organization changes, to continue to adapt and adjust to this operational environment. Today, our aviation structure is designed to support five different active component division organizations and two different reserve component structures.

These specific division structures and varying missions led us to our current aviation force structure that has different organizations. The aviation task force analyzed required capabilities from joint doctrine down to company level in order to develop standardized, basic building blocks for our aviation units.

These company building blocks permit the creation of a truly capable aviation unit of action with standardized, interchangeable and self-contained formations to meet mission requirements. We must standardize all these formations in the active, reserve and guard force and reassign the majority of our corps and theater level assets down to the division and our unit of employment level.

Aviation maintenance must also transform to support standardized and modular concepts. The non-linear battlefield will require transitioning to two-level condition-based maintenance replacing

defective parts on the system while deployed forward and repairing those parts off the system in rear areas or in the United States. We must strive to get more predictive maintenance and commonality for our components and logistics automation in our aviation forces, which will ultimately lead to increased readiness, reduce the costs and shorten the logistics tail.

The Acting Secretary of the Army and our Chief of Staff established the safety for our air crews and enhancement of aircraft survivability equipment as their number one priority. Aircraft operating in theater had the aircraft survivability equipment; however, we have significantly upgraded that capability and accelerated future system fueling for both our rotary wing and fixed wing fleets.

Additionally, the Army is purchasing aircraft ballistic protection sets for deployed cargo and utility helicopters that we own to enhance protection throughout the cargo and passenger compartment. As a result of the recent announcement of the Comanche decision, the Army will be able to reallocate critical aviation resource for procurement, recapitalization and modernization of 70 percent of our rotary wing fleet.

The magnitude of this decision is the assurance that our over \$100 billion investment in Army aviation today remains relevant and ready for the future. Army aviation will take a huge step toward the future with balanced and integrated capabilities, modular and tailorable formations, cohesive and highly lethal units that are deployable, versatile and able to operate in a joint fight.

And key to this—it has already been discussed this morning—is being able to retain that money that was invested in the Comanche program that establishes the required fixes we believe to invest in that capability for the future.

In closing, strengthening Army aviation and investing for a successful future reaffirms the Army's commitment to our soldiers, our sister services and the Nation that only the best equipment and the capabilities put in the hands of the finest soldiers in the world will be brought to bear, protecting our way of life and winning the global war on terrorism.

Thank you for allowing me to share our work and participate in this session. And I look forward to answering your questions, Mr. Chairman.

[The prepared statement of General Thurman can be found in the Appendix on page 109.]

Mr. WELDON. Thank you, General Thurman.

Dr. Laux.

Mr. LAUX. Mr. Chairman, Mr. Abercrombie, distinguished members, I am Mr. Thomas Laux, the program executive officer for air ASW, assault and special mission programs. In representing our Navy/Marine Corps team, I am joined today by Rear Admiral Anthony L. Winns, the deputy director of air warfare for the chief of naval operations, and Brigadier General Samuel T. Helland, the assistant deputy commandant for aviation for the Marine Corps.

Understanding that our full joint statement will be entered into the record, I will emphasize just a few points.

As you are keenly aware, rotorcraft are essential to Navy/Marine Corps deployed forces as evidenced by Operations Iraqi Freedom

and Enduring Freedom. The Navy's fleet of rotorcraft performed like seasoned warriors.

Sustaining this aging fleet while we recapitalize with newer, more capable and more affordable aircraft is what we are about. The Navy helicopter concept of operations outlines the neck-down of the Navy's strike group helicopter force from seven type/model/series to three, the new MH-60 Sierra and MH-60 Romeo, alongside the legacy MH-53E.

The increased capability of the new MH-60 allows the Navy to fundamentally change the concept of operations for helicopters in the carrier strike group, putting all the squadrons, commanding officers and maintenance capability right on the aircraft carrier.

The Marine rotorcraft road map is leading us from the venerable CH-46E and CH-53D to the transformational V-22, from the UH-1N and AH-1W to the UH-1Y and AH-1Z. Further down the road, we need to replace the CH-53E with the CH-53X.

The funding trend for naval rotorcraft will rise as we transition more and more squadrons to these new aircraft. The MH-60 investment alone is \$8.3 billion in fiscal years 2004 through 2009 and will increase an additional \$2 billion in fiscal years 2010 through 2011.

Our current partnerships with industry have achieved much. Key rotorcraft industry partners are: Sikorsky, Lockheed Martin, Bell Helicopter Textron, Boeing, General Electric Aircraft Engines and Rolls-Royce.

This government-industry team has already made significant progress in designing warfighting enhancements for our fleet. Recently, we have begun to really focus this team on driving down the cost of current and future readiness, creating a path to making naval aviation more affordable, while increasing our warfighting dominance.

The V-22 test team has flown over 1,200 hours since the return to flight in late May 2002. We continue to work through the challenges identified by the Blue Ribbon Panel two years ago with very positive results.

All the experts have been engaged. And we are performing well through our rigorous, event-driven test plan.

We continue to work closely with NASA and Army science and technology teams wherever we have an opportunity. The V-22 program just engaged NASA for more wind tunnel and computational fluid dynamics work that will allow the technologists to continue to advance the state of the art in crop rotors.

We paid close attention as our sailors and marines went into harm's way in Operations Enduring Freedom and Iraqi Freedom. We also shared lessons learned with our fellow aviators in the Army and from operations in the Horn of Africa.

This helped us to identify high priority survivability equipment needed to prepare for the Marines' return to Iraq as we speak. These lessons are also translating into our newer programs.

In several instances, the equipment we buy today for the AH-1W will be retained and reinstalled on its replacement AH-1Z. Other aircraft like the V-22 have tremendous survivability enhancements built in from the ground up.

Mr. Chairman, I know that you have many important questions. And I would like to allow maximum time to address them, so I will conclude my statement now.

Thank you for the opportunity.

[The joint prepared statement of Dr. Laux, Admiral Winns and General Helland can be found in the Appendix on page 139.]

Mr. WELDON. We thank you for your statement. And we thank both of you for your attendance today, as well as your colleagues that are here. And if you have anything else that you would like to add, we welcome either one of you. Either Admiral or General, would you like to make any other comments?

General HELLAND. We support Mr. Laux in his statement, sir.

Mr. WELDON. Thank you. And your statements are entered into the record.

First of all, let me just comment about, general, your statement about the troops. Four weeks ago, I had the pleasure of traveling for five days to Iraq, Afghanistan and to spend a day with our troops at the hospital in Ramstein who are on their way back home. In fact, we brought 12 of them back home with us.

And it goes without saying, our troops are the best in the world. They are well trained. Their morale is outstanding. And it is just a pleasure to be in their company.

It is a humbling experience to see what great work is being done in Baghdad up in Tikrit and under General Odierno with the force and over in Afghanistan. And we stayed overnight up at the K2 base in Uzbekistan. They are just doing great work.

And we flew in Black Hawks. And we can attest to the work being done by Army aviation over there and our marine forces, as well as our naval forces. They are all just outstanding.

You heard, general, our statements. There is a lot of frustration on this committee with what has happened to our aviation industrial base and specifically our rotorcraft industrial base, which we think is withering away to nothing, not because of any planned effort, although I think—certainly not on your watch, but the Comanche program over the past 18 years was whipsawed back and forth by a number of people within the Army and within OSD; reconfigured six times.

And in the end, the Army just said, "Hey, you know, we have too many other things we have to address," which is why I am not, like my colleagues, fighting that decision. We understand.

But we are extremely concerned—as Rhett Flater said and as others said—that that money not become the cash cow for a host of other players, both within the Army and other services. And we know this city. And we know the way things operate.

And we saw the taxing of accounts in the 1990's when we had all these deployments, none of which were paid for. And so we applied across-the-board taxes. And in the end, we ended up cutting up our S&T accounts by 25 percent in the 1990's, which was devastating.

And our fear is—our overwhelming fear is—that this money is going to end up, maybe some of it will be used for the planned intention, but maybe a portion of it, maybe a significant portion of it will end up someplace else. Now we have asked, through staff, for you to give us a detailed outline of the \$14.6 billion.

As of this morning, we have not received that. When can we expect to get from the Army your detailed, both one year and out-year assessments, so that we can monitor and track this?

And we can be the bad guy in this process, so the Army can continue to do its work. But we can be the bad guy, as you go through the authorization and appropriation process and to the final conference.

But we have to have the numbers. We have to have the Army's vision. We have to have the substance, the meat on the bones. So when can we expect to have that document?

General THURMAN. Sir, we got the tasking from, as the previous panel members said, from Mr. Wynne in OSD to come back. We had 90 days to give him the complete modernization plan. In light of the decision, we went through and looked at the required capabilities to fix Army aviation.

And it is essential that we get to keep that money to do that. And we have taken a complete holistic look, not only in all our current platforms, but also what we need to do for the future in terms of joint, multi-role rotorcraft and also the other pieces that go with aviation: aviation munitions, logistics and all of that.

And we are compiling that now, sir. And we intend to get that as quickly as we can.

We have already sent our 2005 amended budget request up to OSD that is due over here this week, I believe, that outlines—and I can tell you in the 2005 amended budget, all of the money we are asking for from those Comanche dollars has been placed into what we intend to do to get the required capabilities to fix aviation.

So we are working very quickly to turn that around for you to get that to you.

Mr. WELDON. I may be confused here. I am going to ask my staff director to clarify this for me. But my understanding was that we had been promised that we would get a document sometime this morning. And so Doug, perhaps if you could clarify it?

Mr. ROACH. Last night, you had been working with one of the staff people. At least some of your liaison people had been working with staff here. And there had been an indication that we would have the details of the 2004 reprogramming request and the 2005 budget amendment.

And apparently, that was incorrect information provided to us, that it was not going to be available last night?

General THURMAN. Sir, what I know right now—and I will take that to go back and get you more information on it—is that OSD has sent that to the Office of Management and Budget, the amended budget request for 2005. I do know that.

Mr. ROACH. How about the 2004 reprogramming?

General THURMAN. The 2004, I will go back and I will look and get you a better answer today, if I could take that for the record and get that back?

Mr. ROACH. The committee has a little bit of difficulty in this, in the sense that 90 days put us into a situation that we really cannot address it properly in the markup of the 2005 budget request. So the sooner we get that, the better we can examine it properly and take the appropriate action.

General THURMAN. Yes, sir. I will take that back and we will get you an answer today.

Mr. WELDON. General, we want to be your advocates within the system. And you understand that. And we do not want to put you in the middle of this.

But if we get the information in a timely manner, as Doug said, 90 days from now does not really do us any good because we are in the middle of markup or we are actually done markup by then. So we need to have this information as soon as possible.

And then we can look to put the legislative parameters, the fire walls, the detailed mechanisms to keep that money moving as you want it to go and as we want it to go. Our fear is if we do not have that in, there will be all kind of games played above your pay grade by people who want to fund other priorities that we may support. But we do not want them funded out of this account.

It was a conscious decision made by the Army. It was a very difficult decision that you all made, one difficult for me personally with my constituents. Where I live, 600 constituents are out of work over this decision.

But I understand why it was made. And I am going to do my best to make sure that the technology that you need to have to continue to improve these aircraft are, in fact, there for you and not siphoned away.

So that is why we are being so persistent in this request, and that is to help you. And as the overseers of the way the funding goes in this country, we want to make sure that we exercise that proper oversight role.

You all heard the feelings of the Congress and the committee members on this committee relative to where we are, the frustration that we have. And we are here to make sure that we continue to provide aggressive oversight support in these areas.

We are very dissatisfied with what has happened to our S&T base in the area of aviation for all the services. We, as you know general and Dr. Laux, have kept the support on the V-22. But if it was not for this committee, there would be no V-22 program because back 16 years ago, a decision was made by a previous Secretary and President to cancel the program.

We knew there was no alternative. And we worked hard with the Marine Corps and with the contractor base to keep that program. And we are convinced more than ever that it is going to be revolutionary.

In fact, I have asked the Army why they do not look at ordering some of these V-22s. And so that is something we will keep hanging out there.

But if you want to make any comments on the status, there was a glitch that came up last week, if any one of you want to make a comment to us on the record about what happened and where we are, if there are corrections that are needed, I would welcome those at this time.

Mr. LAUX. If I may, Mr. Chairman, the V-22 specifically, back in December during some routine flight testing of some new flight control software, we identified some unexpected behavior in the aircraft. We analyzed it for the last couple of months. And as a result of that analysis, we have determined that we need to make some

refinements to both the hardware and the software in the flight control system.

The aircraft continued to fly with some modest restrictions down at New River. And they fly essentially unrestricted in the test program. And we are continuing to get good data out.

And we expect that the hardware and software modifications will be designed and installed within the next few months. So we see this as a routine iteration, if you will, in the flight test development program, being handled quite capably by the engineers who are working it.

Mr. WELDON. Thank you.

Anyone else care to make a comment? General? Admiral?

General HELLAND. Yes, sir. From the operational side, and specifically the VMX squadron that we have down in New River, North Carolina, is we continue to build ours on the V-22, now some in excess of 1,200 hours. Our confidence level within the operational is increasing as we continue to fly.

We have two aircraft down there. They fly in conjunction with the operational and test and eval folks at PAX—at Patuxent River.

They share each other's knowledge of what goes on during the flights and the technical database that we are building between the two programs is just increasing. And things are going well.

Mr. WELDON. Great.

Admiral, any comments?

Admiral WINNS. Nothing further to add, sir.

Mr. WELDON. Great.

I will turn to Dr. Gingrey for any comments he would like to make.

Dr. GINGREY. Mr. Chairman, thank you. And I apologize for not being at a lot of this very important hearing and missed actually most of the first panel and the testimony from the second panel.

I am glad I did get back in time. We were having a very important meeting. And as you all know, it is a little difficult to be two places at one time.

I had a question though for General Thurman. General Thurman, yesterday General Abizaid testified before us about the current events in Central Command. And one of the issues that I discussed with him was the protection of the fixed wing and rotorcraft assets in the theater, particularly from the shoulder-fired missiles.

And of course, with this troop rotation that is going on right now and will, I guess, continue for the next couple of months, I thought this was a particular concern to me. And he mentioned that efforts were underway in theater to modernize the survivability equipment on the helicopters that are currently being used there.

Perhaps, if you will, you could elaborate on these efforts and tell me if any of the new funds—maybe the funds that have been freed by the cancellation of the Comanche program—could be used specifically for the protection of these assets. And also, how much of the projected \$14.6 billion will be reinvested into the Army aviation modernization plan, as maybe opposed to new procurements?

If you could discuss that with us, I would appreciate it.

General THURMAN. Yes, sir, congressman. I can. And one of the number one priorities we have, when we looked at the holistic re-

view of aviation, was accelerating our aircraft survivability equipment.

Part of the money to fix that, that we need to do that immediately—and as we have been watching what has been occurring over there, because I can tell you after being on the ground over there, there is a huge proliferation of Man-Portable Air Defense Systems (MANPADS). That is the threat that concerns us now on the battlefield for rotary wing aircraft.

We have programmed \$1.4 billion across the 2004 to 2011 time-frame to be able to outfit all our airframes with better aircraft survivability equipment. We are primarily looking at two things: the Advanced Threat Infrared Countermeasure (ATIRCM) solution, which is a laser jammer; and we are looking the common missile warning system.

Ongoing efforts that is going on right now is with our CH-47 aircraft. And we are putting the ALE-147 on there with the requisite flares and chaff dispensers that we need to have on those airframes and upgrade them.

Dr. GINGREY. General, that is known, I guess, as a Chinook, right? That is a heavy equipment—

General THURMAN. Yes, sir, the CH-47 cargo. And as you know, we had one of those shot down.

Dr. GINGREY [continuing]. And had multiple casualties on that one, right?

General THURMAN. Yes, sir. But we are putting lots of effort into that. And I can assure you, that is the number one priority, to protect those air crews.

Dr. GINGREY. Thank you, general. Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentleman.

Mr. Abercrombie.

Mr. ABERCROMBIE. I beg your pardon, Mr. Chairman.

General Thurman, I appreciate your testimony. I just want to state, by way of that, Mr. Chairman, I wish all the testimony we got was like yours.

It is detailed. In fact, it is so detailed, let me tell you, to get through this, you have to pay close attention. But there are no wasted words in it. And I appreciate that.

General THURMAN. Thank you, sir.

Mr. ABERCROMBIE. Secretary of Defense Rumsfeld has approved the fifth and sixth Stryker Brigades as part of the whole transformation that started with General Shinseki. In fact, you folks, as far as I am concerned and where the Army is concerned, took the lead in this whole thing.

When we talk about transformation, you guys are way ahead of this, structurally as well. And obviously, that has equipment connotations, then right?

No. Part of the problem—not the problem, but because this does take time, you have what was termed “enhancements.” I know the DOD is always inventing words to come up with these things.

But one of the enhancements was, as far as I can figure out, what they call “organic aviation element,” right? Now as best as I can figure out or if I have this down right, that was going to be the Comanche helicopter. So now we are up to the fifth and sixth

Stryker Brigades, which is the National Guard. Isn't that the Pennsylvania? I forget which—

General THURMAN. The 28th Division, sir.

Mr. ABERCROMBIE. Yeah, in Pennsylvania. And the 25th Infantry, obviously.

Now under the new aviation plan, the Army aviation plan, how are you going to deal with this organic aviation asset? Now you may not be prepared today to say what that is going to be. But I need to know or we are going to have to know and I think, if it is possible, to know in this cycle of our last session of this Congress.

If we can deal with that, that is very important to us. Because I do believe in the Stryker Brigades in terms of their utility.

And right now, what I am dealing with out in Hawaii, I have obviously a parochial interest in this because I have been instrumental, to the degree that I am meeting my responsibilities here, in getting new training facilities set up. We are in the process right now of going through our environmental impact statements and so on.

And in order to avoid going to court, in order to be able to prevail on questions of environmental impacts, adverse or otherwise, all of the things associated with constructing brand new training facilities over thousands and thousands of acres, shutting down other training facilities because they are no longer adequate to the task. They are obsolete.

You can imagine the difficulty that is going to occur, especially those who are skeptical of whether or not we should even be doing this kind of thing. I am not talking within the services. I am talking about in a place like Hawaii where you are going to have people who think, "Look, we do not want this here," or "This is going to adversely impact our environment," which you can imagine, in Hawaii—if you have been there, General Thurman—is very, very fragile.

So I need to know what is going to happen with regard to the aviation and helicopter element of this because that may change the entire concept and implementation of what constitutes the training facilities. Now you may not be prepared to answer that today. But we are going to have to have an answer real soon.

This is not something that can be put off because as we speak, plans are being drawn, statements are being made as to what the terms and conditions are going to be for the training facility. I hope that makes sense to you.

General THURMAN. Yes, sir. It does. And I understand. I can comment on what we want to do with our aviation for Stryker and what we want to do in the 25th Infantry, our light division, one of our light divisions.

First off, I want to make a comment about Stryker. That element, that brigade that we have in Iraq today is performing superbly. And thanks to the great support that we have received from Members such as you, we were able to bring that to the forefront.

Now we are supporting that organization with an aviation task force that was built—we pulled it from across the Army, quite frankly, to put it together. The study that we just completed builds modularity across the force and standardization.

Now what does that mean? We standardized all the basic building blocks of aviation—our attack, our reconnaissance and our lift structures. And so we, for the 25th Infantry Division, we standardized a package. So quite frankly, they are going to grow in airframes to be able to modularize and task organize properly to support all those formations.

Because what we had to do is we had to be able to have enough aviation to support 48 combat brigades and 34 National Guard brigades. So you quickly run out of assets.

And I do know that Comanche was organic, assigned right down to a brigade. But based on the results of the study that I presented to the chief of staff of the Army, it was our recommendation—

Mr. ABERCROMBIE. How long ago did you present that?

General THURMAN. Sir, I presented that on the 7th of November. And he told me that—

Mr. ABERCROMBIE. You did not know that the Comanche would be cancelled at that point.

General THURMAN. I did not, sir, because what I was told was what capability do we have to put out to make Army aviation more combined arms capable.

Mr. ABERCROMBIE. Sure, I understand. But what is your situation now that the Comanche—let's presume the Comanche is cancelled, is going to be cancelled. Now you have to deal with this. And I can tell you right now, there are people out in Hawaii doing the environmental impact statement for the new Stryker Brigade training facilities that are going to have to immediately adjust to one degree or another what it is they are focused on.

General THURMAN. Sir, in our recommended plan, as a result of the cancellation of Comanche, we want to buy another Scout Helicopter.

Mr. ABERCROMBIE. I am sorry?

General THURMAN. We want to procure another Scout Helicopter to replace that, which would go in that organization. And when I say that organization, it would be at the division level, to be able to support that.

Mr. ABERCROMBIE. I do not want you to get ahead of yourself if you are not fully prepared to say exactly what is going to happen. But you recognize this is a matter of some import to the chairman and to this committee because we have to decide where to place our dollars and have a good idea of what the Stryker is going to be doing in the years to come.

General THURMAN. What I would like to do on the impact of the training facility is take that for the record and get back and give you a more detailed explanation.

Mr. ABERCROMBIE. Would you do that?

General THURMAN. Yes, sir, I would.

Mr. ABERCROMBIE. Not just for us, obviously, but training facilities all associated with the new Strykers and with this. So it is the Scout Helicopter?

General THURMAN. Yes, sir. What will actually happen is we are going to have multiple helicopters that will support the 25th Infantry, a plus-up of lift helicopters, primarily UH-60, cargo helicopters of CH-47 platforms and then an armed reconnaissance helicopter.

Mr. ABERCROMBIE. Thank you very much.

Mr. WELDON. Thank you, Mr. Abercrombie.

Mr. Larson.

Mr. LARSON. Thank you, Mr. Chairman. And following up, as I did with the first panel and at the bequest of the chair, I just wanted to ask the Army specifically with regard to this \$14.7 billion and, as you have heard here today from committee Members, optimally our ability to fence that off.

And also I would like to know specifically if the Army intends to see that competed, so that American-made, American-engineered, American labor is involved in the production of this next generation of helicopters that is needed for our national security.

General THURMAN. Sir, I understand your question. What we intend to do is first off accelerate our aircraft survivability equipment on all our platforms.

But we want to fund Apache Block III conversion. And that is 284 Apache Longbow Block IIIs, which will take all of the capabilities that were basically in Comanche, minus the low observation, and be able to take that to the next step.

We want to be able to buy more Black Hawks. We must buy more Black Hawks. And that was part of the things that we have to do, not only to account for attrition, but also assist with our reserve component forces.

We want to buy additional Chinooks. And we want to buy a cargo fixed wing aircraft.

We want to take those dollars that were in the Comanche and invest in common cockpits. So we have the same multifunctional displays in those platforms. And that gets at this shortening the logistics tail on the battlefield.

Fly-by-wire, one of the pluses that was in Comanche, so we can minimize these dust rollovers that we have been experiencing in the environments that we are flying in, which was in the Comanche. And we must invest in the aviation munitions that we are short. And that is primarily the Hydra-70 rockets, the Hellfire and the bridge to the joint common missile.

We are also wanting to initiate a joint multi-role helicopter program, which includes a couple of things in addition to what we currently are supporting in OSD is the Joint Vertical Airlift Task Force, which was mentioned this morning. And then part of this also resources our Army UAV requirement.

In our reserve components out there, we must divest the UH-1 and OH-58A and C helicopters. Currently, there are roughly about 880 of them out there. And we want to take and divest those and get a light utility helicopter because when we did this study, there is also a huge requirement for homeland defense that we did not have before that we think that we can fill that bill out there with a light utility helicopter.

We are currently working the initial capabilities documents on those that will be handed over to our executive acquisition agent to start working with industry to come up with what we are asking for.

Long answer, but—

Mr. LARSON. Well, long answer, but important answer. And these will be American built, American labored?

General THURMAN. Sir, we have not previously selected a foreign competitor for helicopters. I cannot guarantee you who the winner is. And I cannot sit here today and say that this firm is going to get that.

But I know you know who makes the Black Hawk Chinook and our Apaches. And those are very good airframes out there. And they are pulling a big load out there for the U.S. Army today.

Mr. LARSON. Well, they are excellent companies and firms. My ongoing concern is that they not be outsourced to a foreign entity. And I obviously cannot make myself any more clear on that.

Mr. ABERCROMBIE. Would the gentleman yield?

Mr. LARSON. Yes.

Mr. ABERCROMBIE. You mentioned the Black Hawks. Now we just had trouble with the Comanche. Are you having trouble with quality control or anything like that with Black Hawks? There are reports about that.

General THURMAN. Sir, I cannot personally speak to that. I mean, that has not been brought to my attention based on what I have been doing as the task force for Army aviation review.

I saw a recent article that was in the Early Bird is the only thing that I have seen.

Mr. LAUX. I could help out.

Mr. ABERCROMBIE. You say you saw an article. Doctor, can you comment? I do not want to get diverted in here.

But when you have something like the Comanche take place. You know, people like ourselves, I am not an aeronautical engineer. Maybe there are some members that have various engineering and physics backgrounds and so on that can do it.

We are utterly and totally dependent on the professional judgment and accurate assessment of those who come before us, indicating what direction we should be moving in. Now if there are issues like this, we need to be told.

Nobody is going to get taken out and shot. This is not China.

We need to know. So that is why I am asking.

Mr. LAUX. Mr. Congressman, the Army and the Navy both build/buy H-60's up at Sikorsky. The Army and the Navy observed that there had been a rash of quality discrepancies on aircraft that were offered for sale to be turned over to the Army and to the Navy.

Working with the local Defense Contracting Management Agency (DCMA), who is the government rep on site, if you will, we took note of these discrepancies, which were self reported by Sikorsky. It was determined that there had been too many of them too close together, if you will. Sometimes, these things come in spaces.

These are not safety of flight level discrepancies. And we intervened to make sure that this issues did not become a safety of flight issue.

We have been working very closely, with very active cooperation from Sikorsky. We expect that by tomorrow, this will pretty much be behind us.

We resumed flying government aircraft at the plant earlier this week. And we expect that the aircraft that were previously presented for sale will, in fact, be accepted, perhaps as early as tomorrow, but certainly by sometime next week.

So we expect this to be beyond us very quickly. Not a major issue.

Mr. ABERCROMBIE. Okay. Thank you.

Mr. LARSON. Dr. Laux, we recently received a reprogramming that would cut two MH-60Rs, leaving only four in 2005. You cite the MH-60 as a major program. What is the impact of the reprogramming request?

Mr. LAUX. The intention of the reprogramming was to allow the program to catch up to where it needed to be to match the procurement of the new aircraft. We had experienced some difficulty in getting the qualification of the mission systems on the aircraft during the development test.

We did an operational assessment of the aircraft, determined it was not quite as far along as we were hoping that it would be at that point. So we essentially slowed down the ramping up of the production. And so four is enough to keep things going.

And as soon as we successfully complete the operational evaluation, we expect to ramp that up fairly quickly to get it back to where it needs to be.

Mr. LARSON. Thank you, sir.

Mr. ABERCROMBIE. Mr. Chairman, could I follow up on that? Please, just a moment?

Mr. WELDON. Yes, sir.

Mr. ABERCROMBIE. If that is the case though doctor, why is it any and all then because the impression here is that you have the Office of Management and Budget or somebody coming in and making a decision because it fits? You know, it is easy for us to go and assume something like that because we do not have much in the background.

Look, we are not going to get into another Comanche deal, I hope, where we keep authorizing money and money gets appropriated that we could be putting into other things. Why do we have four? Why do we have any at all if it is not ready?

Mr. LAUX. Sir, it is always a balance between how far along you are and the cost of getting the production program going. The program, during this operational assessment, found a number of enhancing characteristics. Some things are working very well.

Mr. ABERCROMBIE. I am not disputing that. And I do not want to take a lot of time from the chairman's kindness in letting me follow up on the question. We are talking about this year's budget, right?

Mr. LAUX. Yes, sir.

Mr. ABERCROMBIE. But if you are not ready to go, why should we put anything at all? It is not like we are going to slap your hand or punish you or something. But why should, when we are talking about scarce dollars anyway and where to put them, why should we put dollar one in?

Are you going to be able to do four of them this year?

Mr. LAUX. Yes, sir.

Mr. ABERCROMBIE. Well, then I do not understand. If the problems are solved, why couldn't it be six, if you think you are going to be able to do four? Are you going to solve it month by month or something?

Mr. LAUX. Well—

Mr. ABERCROMBIE. I mean that. I am not trying to be sarcastic with you. How do you come up with four rather than six? Why shouldn't it be zero unless you are ready to—when will the first one of the four be ready to go if we vote this money?

Mr. LAUX. If we contract now, it takes about two years for the aircraft to actually be delivered. The assessment we made was that nothing that we are going to be doing, spending money now, is going to go into hardware changes, for example, that will require rework in the middle of production.

We are talking software changes, things that could be worked out in the lab. And we can get them flight tested in a very straightforward manner. We expect the operational—

Mr. ABERCROMBIE. So this is a software, not a hardware problem?

Mr. LAUX. Yes, sir.

Mr. ABERCROMBIE. And it is a software problem that what, you did not have bright enough people working on it to this point?

Mr. LAUX. The integration of these highly complex mission systems turned out to be a bit more challenging than was initially programmed.

Mr. ABERCROMBIE. But it is not something that is going to defy the laws of physics?

Mr. LAUX. Absolutely not. No, sir.

Mr. ABERCROMBIE. Okay. But you get, Mr. Chairman, why I am asking these questions?

I am a little gun-shy now of this when somebody says, "Well, it is something we have to fix. And it will be done in time," because we wait years sometimes. And it never gets done.

And I would rather put the money somewhere else. So you can assure us this a software question that is just a matter of emphasis?

Mr. LAUX. That is a good way to look at it. Yes, sir.

Mr. ABERCROMBIE. Okay. Thank you.

Mr. WELDON. I thank the gentleman. We thank you all for your appearance and for your service of the country.

Before we adjourn, I would like to introduce someone who has been in the audience for the last 40 minutes, who I think is a special friend to the U.S. because when the President decided to go into Iraq, besides sending our sons and daughters, he enlisted the support of other countries.

One of the first countries to take up that cause and join with us was Ukraine, a former Soviet state that was under tremendous pressure by Russia not to get involved. Ukraine, their President, their leadership in the Rada and the ambassador who was here at the time, Konstantin Grishenko, now the foreign minister, stood with us.

They gave us a 500 unit Chem/Bio team. They have since deployed well over 1,000 troops who are serving right next to America in harm's way.

We appreciate that. It was also Ukraine that was very helpful in making quiet contacts with Moammar Qadhafi to get the Libyans to do exactly what they are doing now. That story has not been told. But one day, it will be told.

And I wanted to introduce the new ambassador from Ukraine, Mykhailo Reznik, who has joined us. Thank you for joining us today. And thank you for the support of the people and troops of your country. Thank you.

With that, this hearing stands adjourned.

[Whereupon, at 11:43 a.m., the subcommittee was adjourned.]

A P P E N D I X

MARCH 4, 2004

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

MARCH 4, 2004

Statement of the Honorable Curt Weldon
Chairman, Subcommittee on Tactical Air and Land Forces
Aviation Industrial Base and DOD Rotorcraft Programs
March 4, 2004

The Subcommittee will come to order.

This morning the Tactical Air and Land Forces Subcommittee meets to receive testimony from government and industry witnesses on three important subjects:

First, the views and implementing action, where appropriate, from representatives of the Departments of Defense and Commerce on the recommendations contained in the November 2002, "Final Report of the Commission on the Aerospace Industry,"

Second, the view of the American Helicopter Society International provided by its Executive Director on the health of the rotorcraft industrial base and the issues of primary interest to the rotorcraft industry, and

Thirdly, the rotorcraft programs and the related Fiscal Year

2005 budget requests from witnesses from the Departments of the Army and Navy.

The Final Report of the Commission on the Future of the Aerospace Industry was submitted to the President and Congress in November 2002. That report made some striking, broad conclusions, in assessing the national aerospace industry. These conclusions include:

The “critical underpinning of this nation’s aerospace industry are showing signs of faltering,”

The nation stands “dangerously close to squandering the advantage bequeathed to us by prior generations,”

“The federal government is dysfunctional when addressing 21st century issues from a long-term, national and global perspective,” and

“The nation is at risk in the future if the United States continues to proceed without a policy that supports aerospace capabilities.”

The Commission notes the number of aerospace suppliers has dropped from 70 in 1980 to 5 prime contractors today, 600,000 scientific and technical aerospace jobs have been lost in the last 13 years, and the number of aerospace scientists has dropped from

145,000 in 1986 to fewer than 25,000.

Further, the Aerospace Industries Association reports that U.S. market share of global commercial sales dropped from 72 to 52 percent between 1985 and 2000, aerospace profits are at their lowest level in eight years, and the aerospace trade surplus has experienced a 32 percent drop since its high of \$41 billion in 1998.

The Commission report also concludes that U.S. aerospace companies are disadvantaged in the international market place due to foreign government market intervention in areas such as subsidies, tax policy, export financing, and standards.

The Departments of Defense and Commerce, working through the interagency process, have had over a year to review and consider the report. We hope to hear from the representatives of the Departments of Defense and Commerce on whether they agree with these general conclusions and other specific conclusions and recommendations of the Commission and if so, what has been done or is contemplated as corrective action.

We also hope to hear from our rotorcraft industry association witness on his assessment of the Commission's views and whether in his view adequate action is being taken to provide our aerospace industry an economic level playing field in international commerce.

Our Army and Department of the Navy witnesses will update us on their rotorcraft programs. We are particularly interested in the details of the restructured Army Aviation program, the Joint V-22 program and the status of the V-XX program.

We have two panels. The first representing the Departments of Defense and Commerce and the American Helicopter Society International to discuss the Commission on the Aerospace Industry report and the rotorcraft industrial base and the second, representing the Army and Department of the Navy to discuss their rotorcraft programs.

On the first panel:

Representing the Department of Defense, Mr. Al Shaffer (SHAY-FER), Director Plans and Programs for the Director,

Defense Research and Engineering, Office of the Secretary of Defense

Representing the Department of Commerce, Deputy Assistant Secretary Joseph Bogosian , and

Representing the American Helicopter Society International, its Executive Director, Mr. Rhett Flater

Our second panel will be comprised of:

Major General James Thurman, Director of the Army Aviation Task Force,

Dr. Thomas Laux (LOCKS), Program Executive Office, Air, Anti-submarine warfare, Assault, and Special Missions

Dr Laux is accompanied by Rear Admiral Andy Winns, Deputy Aviation Requirements Officer for Helicopters and Brigadier General Samuel Helland, U.S. Marine Corps

Thank you to all of our witnesses for joining us. We look forward to your testimony.

Before we begin I would like to ask my good friend from Hawaii if he has any opening remarks he would like to make.

(Mr. Abercrombie)

I would like to proceed with the first panel's testimony and then go to into questions for that panel and then take testimony from the second panel, which will then be followed by questions.

Without objection, all witnesses' prepared testimony will be accepted for the record.

Mr. Shaffer, please proceed with your opening remarks.

At this point, without objection, I would like to include in the record the written testimony of Ms Susanne Patrick, Deputy Undersecretary of Defense (Industrial Policy), who could not be with us, but has provided testimony on the defense rotorcraft industrial base.

Secretary Bogosian, thank you for being with us. It is a bit unusual to have a representative of the Department of Commerce with us, but responsibilities residing in the Department of Commerce have a potentially major impact on the aerospace industry as a whole and the ability of industry to provide affordable, technologically advanced aerospace systems to DOD. Department of Commerce responsibilities monitoring the implementation of trade agreements that are specific to the aerospace industry, identifying constraints on the trade

performance of the U.S. aerospace industry, recommending ways to neutralize such constraints, and monitoring and reporting on the economic and technological health of the aerospace industry are all of interest to the Subcommittee. Please proceed with your opening remarks.

Rhett, good to see you again, welcome back to the Subcommittee, please proceed with your opening remarks.

That concludes the testimony for our first panel. Will the Army and Department of the Navy witnesses please be seated.

General Thurman, welcome, please proceed with your testimony.

Thank you, General Thurman, Dr. Laux (LOCKS) (please proceed with your testimony.

Dr. Laux, thank you for your testimony.

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TESTIMONY OF

ALAN R. SHAFFER

**DIRECTOR OF PLANS AND PROGRAMS
OFFICE OF THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING**

BEFORE THE UNITED STATES HOUSE OF REPRESENTATIVES

COMMITTEE ON ARMED SERVICES

SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

March 4, 2004

**FOR OFFICIAL USE ONLY
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SERVICES COMMITTEE**

Mr. Chairman, members of the committee, thank you for the opportunity to appear before you today to provide an update on the progress made by the Department of Defense (DoD) research and engineering program in meeting the recommendations made in the Report of the Commission on the Future of the United States Aerospace Industry; the Walker Commission report. While the report had nine broad recommendations, my testimony shall focus on the progress made by the DoD research and engineering community. Before addressing specific aspects of the report, it is important to point out that aerospace power has been critical to U.S. military operational capabilities almost since the first flight of the Wright Brothers a century ago. Air and space power shall continue to be a critical component of the DoD operational mission. On the occasion of the 100th anniversary of flight last December, President Bush said "A great American journey that began at Kitty Hawk continues in ways unimaginable to the Wright brothers. One small piece of their Flyer traveled far beyond this field. It was carried by another flying machine, on Apollo 11, all the way to the Sea of Tranquility on the Moon. These past hundred years have brought supersonic flights, frequent space travel, the exploration of Mars, and the Voyager One spacecraft, which right now is moving at 39,000 miles per hour toward the outer edge of our solar system. By our skill and daring, America has excelled in every area of aviation and space travel. And our national commitment remains firm: By our skill and daring, we shall continue to lead the world in flight."

As it has in the past, aviation and space capabilities continue to be at the forefront of the DoD goals. In the 2001 Quadrennial Defense Review, Secretary of Defense Donald Rumsfeld listed six critical operational goals for the Department. Aviation and space are central to those goals, and when integrated with the concept of network centric

warfare, will drive our military advantage in a changing world. Together, aviation and space capabilities are critical to enabling all six QDR goals and are key specifically to denying enemy sanctuary, projecting and sustaining U.S. forces, protecting U.S. bases of operation, and conducting space operations.

The Aerospace Commission made recommendations in nine broad areas. Recommendations in four of the areas are directly applicable to the DoD. I shall restate the salient recommendations and briefly discuss activity within the Department that addresses them.

1. Recommendation 3: The Commission recommends that the United States create a space imperative. The DoD, the National Aeronautics and Space Administration and industry must partner in innovative aerospace technologies, especially in the areas of propulsion and power.

Over the past two years, the Director of Defense Research and Engineering has led an interagency initiative that responds directly to the recommendation made by the Commission. This initiative, known as the National Aerospace Initiative (NAI), is a focused effort to coordinate technology development and demonstrations in three key aerospace technology areas. The three technology areas are the pillars of the NAI: high speed and hypersonic flight; space access; and space technologies. The most extensive collaborations have occurred in the high speed and hypersonic technology flight pillar. We appreciate the support provided by the House Armed Services Committee in the NAI related research and development in FY04. The FY04 program started the Single Engine Demonstration (SED). The SED is an advanced prototype hypersonic cruise missile that will integrate the United States Air Force Hypersonic Technology (HyTech) engine with

air vehicle technologies developed by DARPA. The project and technology path are supported by federal and industrial hypersonic researchers and build on previous DoD-NASA efforts.. This exciting new demonstration will be flight tested by the end of the decade, will represent the world's first demonstration of a practical flight vehicle propelled by a hydrocarbon supersonic combustion ramjet (scramjet), and should ultimately achieve a Mach 7 to 8 flight. This is a significant effort; success will enable a new aviation flight regime, historically analogous to the revolutionary introduction of the jet engine to propeller-driven aircraft.

The second area of significant collaboration is in the area of advanced rocket propulsion. A key element under the NAI in the joint NASA-Air Force program is called the "Integrated Powerhead Demonstration" (IPD), which will culminate with a complete engine test at NASA's Stennis Space Center in 2005. This demonstration has been a very successful partnership between the United States Air Force and NASA, with four successful component demonstrations occurring in the past 18 months. This is yet another significant effort because the success of this new engine cycle will enable a 25% increase in rocket engine reliability, a 200-mission life for the engine, and a reduction in engine maintenance time and cost. DoD-NASA cooperation leading to the IPD should result in future reusable vehicle propulsion and will overcome current material technology barriers by reducing engine operation temperatures

Finally, it is important to acknowledge that the NAI also includes continuation of successful long term collaboration in the form of the Integrated High Performance Turbine Engine Technology (IHPTET) / Versatile Affordable Advanced Turbine Engines (VAATE) projects. IHPTET is a program that started in the late 1980's, and involved

collaboration of DoD, NASA, and industry to have a long-term, focused research program to improve turbine engine technology. IHPTET is currently developing the revolutionary turbine accelerator, which will allow turbine propelled vehicles to reach hypersonic ignition speeds. This turbine engine technology is an essential part of and boost to the health of the national aircraft industry.

There are other federal interactions and collaborations that will support Recommendation 3. An example is the Joint Planning Development Office, which is a federal collaboration between the DoD, NASA, Federal Aviation Administration (FAA) and Department of Homeland Security (DHS). This collaboration is working to create the next generation air management system.

Through rapid advancement in aerospace capabilities, the NAI and other collaborative efforts will effectively merge air and space, spur innovation in critical high technology areas, and reinvigorate the U.S. aerospace industry, as well as excite and inspire our Nation's next-generation high-technology science and engineering workforce. While there is a great deal of promise, it is important to point out that these plans are being reviewed and modified, as NASA is adjusting their portfolio and priorities following the Columbia disaster. But, even without concrete flight demonstrations, the NAI is significant for necessary technology development and organization.

As part of the process of organizing the NAI, the DoD and NASA have organized a joint project office, with technologists from both NASA and the DoD working out of one location on similar goals. These technologists are coordinating on-going programs at the sub-component technology level, leading to very strong information and technology

sharing. While there is still much to do, there have been significant accomplishments over the past two years.

2. *Recommendation 4: The Commission recommends that the nation adopt a policy that invigorates and sustains the aerospace industrial base. This policy must include*

- a. Procurement policies which include prototyping, spiral development, and other techniques which allow the continuous exercise of design and production skills;*
- b. Stable funding for core capabilities, and*
- c. Sustaining critical technologies that are not likely to be sustained by the commercial sector.*

Portions of this recommendation are well beyond the purview of the DoD science and technology program; however, the Department has made some substantive changes in technology programmatic and acquisition policy over the past two years that address the theme of prototyping, spiral development, and technology insertion. In the past two years, the DoD has issued revised acquisition regulations that encourage and promote spiral development and incremental technology insertion. In addition, the Department has made programmatic changes to encourage a “try before you buy” approach to acquisition. In November 2003, the Department revised the charter of the Director of Defense Research and Engineering, to make the DDR&E responsible for a broader swath of the acquisition process, adding the responsibilities for “Advanced Component Development and Prototyping” to the existing DDR&E portfolio. These actions should result in greater prototyping before moving into specific acquisition programs of record.

The DoD is also increasing investment in technology demonstrations. Over the past several years, the Advanced Concept Technology Demonstration (ACTD) Program has grown significantly. ACTDs are demonstrations of technology moving from the science and technology world to the acquisition world. For example, the Predator Unmanned Aerial Vehicle (UAV) emerged from the ACTD program several years ago. Over the past three years, ACTDs have grown by over 25% to the present budget request of \$213M in FY05. Since ACTD projects are typically matched with about three dollars from the sponsor command for every one dollar invested by the ACTD program office, the total program value is actually closer to \$800M per year. While these funds are spread over many different projects, some are invested in efforts that directly address the aerospace industry. For instance, the ACTD program is actively developing a High Altitude Airship, which is akin to a stratospheric dirigible. This platform will maintain position in the stratosphere for several months. This technology will open up new reconnaissance and surveillance possibilities. Another ACTD of aerospace significance is the "Advanced Tactical Laser" ACTD, which will attempt to marry a high energy laser with an AC-130 gunship. While not specifically an advanced aerospace technology application, this ACTD should provide a broad new aerospace mission area.

3. Recommendation 8: The Commission recommends the nation immediately reverse the decline in, and promote the growth of, a scientifically and technologically trained U.S. aerospace workforce. In addition, the nation must address the failure of the math, science, and technology education of Americans. The breakdown of America's

intellectual and industrial capacity is a threat to national security and our capability to continue as a world leader.

Clearly, the Commission was concerned with the decline in production of U. S. scientist and engineers. This concern is also shared by the Department of Defense Chief Technology Officer, the Director of Defense Research and Engineering. The following excerpt is taken directly from a DDR&E testimony given on March 3, 2004.¹

“There are warnings that America’s advantage in defense-related scientific and engineering intellectual capital is eroding. For example, the significance and priority of this problem was (also) outlined in the “Report of the U. S. Commission on National Security in the 21st Century (the Hart-Rudman Report) which stated: *Second only to a weapon of mass destruction detonating in an American city, we can think of nothing more dangerous than a failure to manage properly science, technology, and education for the common good over the next quarter of a century.*”

The decreasing numbers of experienced, expert scientists and engineers available for National Security efforts come from the available pool of scientists and engineers who are U. S. citizens. The number of those U. S. citizens in graduate schools in defense and national security related disciplines has been decreasing for the last decade, according to National Science Foundation, National Science Board, and National Academy of Sciences Reports.”

This excerpt from the DDR&E testimony becomes even more significant when two additional factors are considered: the growth in S&E production in the rest of the world, and the dependence on DoD funding for U.S. universities research in several significant technology areas. The first factor, production of S&Es worldwide, is

¹ Formally, it was given to the Senate Armed Services Committee hearing on 3 March 2004

something that the DoD and the entire national security community needs to pay attention to. For instance, China has experienced an exponential growth in domestically produced scientists and engineers over the past 5-10 years. There is evidence that they now produce the largest number of scientists and engineers in the world. In addition, citations in some U.S. based journals, such as *Physics Review*, have increasingly seen an increase in the number of published papers by foreign authors. Growth in intellectual knowledge worldwide is a good thing—provided the United States continues to produce world class S&E's to allow our nation to meet any challenge.

The second relevant factor is slightly more subtle. According to annual statistics published by the National Science Foundation, there are a number of physical science areas where the DoD provides between one-third and one-half of all government funded university research dollars. These areas include: aeronautical engineering, mechanical engineering, electrical engineering, materials science, and computer science. In short, the scientific core of the aerospace sciences. This issue is one that affects the entire national security infrastructure, and is being looked at by the National Security Subcommittee of the Committee on Homeland and National Security under the National Science and Technology Council.

Taken as a whole, the picture is of concern—U. S. production of S&Es as a whole is declining, while the production of S&E's in the rest of world is growing. To combat this trend, we believe at least two things must happen—there should be sufficiently exciting projects to spark the interest of young minds, and there should be sufficient funds to provide incentive for a young person to enter a scientific field. In the DoD, and in NASA, there are cutting-edge projects to attract young researchers. Projects such as

the single engine demonstration and the Army hydrogen-based missile demonstration should achieve Mach 7 and 12 respectively. The Force Application and Launch from CONUS (FALCON) hypersonic vehicle, a DARPA project, will develop a reusable hypersonic aircraft capable of delivering 12,000 pounds of payload to a target 9,000 nautical miles from the continental U.S. in less than two hours. These *are* truly interesting projects!

Over the past year, the DoD has increased both the total number of and annual stipend for Graduate Science and Engineering Fellowship programs. Hence, the DoD is beginning to provide financial incentive. We are continuing to examine our future workforce needs to ensure that we will have the best technical talent available for national security R&D.

4. Recommendation 9: The Commission recommends that the federal government significantly increase its investment in basic aerospace research, which enhances US national security, enables breakthrough capabilities, and fosters an efficient, secure and safe aerospace transportation systems. The U. S. aerospace industry should take a leading role in applying research to product development.

The Department of Defense has increased both the investment and focus of research in aerospace areas over the past three years. In fact, the two technology areas with the largest funding increases have been aerospace and combating the global war on terrorism. The Department of Defense tracks the raw investment in specific technology areas through the Defense Technology Area Plan (DTAP), which aligns technologies and investments. Comparison of the science and technology investment in the Air Platforms

and Space Platforms technologies between the FY2002 and FY2005 Budget Request shows the following trend:

	FY2002	FY2005	Percent increase since FY02
Air Platforms	\$443,921M	\$691,889M	56%
Space Platforms	\$176,646M	\$380,112M	115%

But, the Commission report also recommended an increased investment in long-term aerospace research in the following areas: Information Technology; Propulsion and Power; Noise and Emissions; Breakthrough Energy Sources; Human Factors; and Nanotechnology. Investment into the science and technology base for all these areas is increasing in the Department of Defense. Additionally, the DoD has increased investment and work in modeling and simulation of flight profiles and computational fluid dynamic codes for engines, airframes, and now, hypersonic combustion. The Department has also focused a science and technology effort, called "Energy and Power Technologies" which has goals of increasing energy density from materials and batteries and increasing the energy efficiency of solar collectors in space.

Clearly, the investment has, in fact, increased. But, more important than the basic investment is the content of the program. Consider the additional following significant technology activities that have occurred over the past several years:

- The Integrated High Performance Turbine Engine Technology (IHPTET) program has increased the operating parameters of the turbine engine to support the next generation turbine engines for military and (spin-off) civil applications, effectively

doubling capability, including increased thrust-to-weight and decreased specific fuel consumption (SFC), since the program's inception.

- The Versatile Affordable Advanced Turbine Engine Program (VAATE) follows on from IHPTET and is specifically focused on affordability and manufacture of the follow on turbine engines. The goal is to achieve an order of magnitude improvement in turbine engine affordability.

- The Navy Hypersonic Flight (HyFly) and Revolutionary Approach to Time Critical Long Range Strike (RATTLRS) programs, which will fly a Mach 6, dual-combustion ramjet and Mach 4 turbine for missile applications.

- Integrated High Payoff Rocket Propulsion Technology Program (IHRPT), a joint DoD / NASA / U.S. industry effort, has increased the performance, life, reliability and affordability of solid rocket motors, liquid engines and electric propulsion for space launch, on-orbit and strategic and tactical missile systems.

- The DARPA FALCON program, which will develop and demonstrate the basics of controlled hypersonic flight at stratospheric altitude.

- The DARPA / Army A-160 Hummingbird unmanned helicopter demonstration—a program which will provide the advantages of hover and helicopter operations in an unmanned vehicle

- The new DARPA, Navy, and Air Force Joint Unmanned Combat Aviation System (J-UCAS)—a family of platforms to conduct future combat air operations in unmanned platforms.

The list could be much longer. It is not important to list all the specific programs, but rather, to characterize the current DoD research and engineering program

as one of great growth and exciting possibilities for both air and space capabilities. The Department is opening new regimes of speed, autonomous operations, power, and air frames needed to move forward, with industry, into the next golden age of flight.

SUMMARY

This testimony has addressed the role of the DoD research and engineering program in responding to the recommendations of the Walker Aerospace Commission report. The report has a recommendation that is appropriate to use for the summary. Recommendation 1 of the report says "The integral role aerospace plays in our economy, our security, our mobility, and our values makes the global leadership in aviation a national imperative. Given the real and evolving challenges that confront our nation, government must commit to increased and sustained investment and must facilitate private investment in our national aerospace sector. The Commission therefore recommends that the United States boldly pioneer new frontiers in aerospace technology, commerce, and exploration."

I have attempted to demonstrate that the overall DoD research and engineering program does respond to the Commission report, because aviation and aerospace are central to the future military operations of the Department. Aerospace research and systems have been, and will continue to be, at the forefront of the DoD's needs. The growth in funding and focus of the Department's S&T investment in aerospace areas demonstrate the importance of the aerospace industry to the DoD.

**Statement of
Suzanne D. Patrick
Deputy Under Secretary of Defense (Industrial Policy)
on the
Defense Rotorcraft Industrial Base
before the
Subcommittee on Tactical Air Land Forces
of the
Committee on Armed Services
House of Representative
March 4, 2004**

I appreciate the opportunity to submit my testimony for the record. I have structured my testimony in two parts. First, I will discuss Department responses to the report of the Commission on the Future of the U.S. Aerospace Industry. Second, I will address the defense rotorcraft industrial base within the context of the overall defense industrial base.

**Commission on the Future of the United States Aerospace Industry Report:
Department Responses**

In November 2002, the Commission on the Future of the U.S. Aerospace Industry concluded that it was necessary “to call attention to how the critical underpinnings of this nation’s aerospace industry are showing signs of faltering—and to raise the alarm.” The report contained several recommendations “intended to catalyze action from leaders in government, industry, labor and academia and ensure this industry’s continued prominence.” The Department followed the Commission’s deliberations closely because it agrees that the aerospace industry is critical to maintaining U.S. military supremacy in the 21st century. The Department has focused its attention primarily on that portion of the aerospace industry that supports military requirements.

The Current Defense Industrial Base: Healthy and Innovative

Although there are today, and always have been, niche areas of concern, overall, the defense aerospace industrial base is healthy, innovative, and responsive as reflected in key measures of its financial health, and especially as demonstrated in Operations Enduring and Iraqi Freedom. Aerospace/defense firm operating margins are about 50 percent higher than in the 1980s. The return on invested capital is about 6 percent, surpassing the 5.4 percent return of the Standard & Poor's (S&P) 500. The industry price-to-earnings (P/E) ratio at the end of 2003 was about 35, well above the historical average of about nine, and surpassing the S&P 500 P/E ratio of 28. And finally, debt service capacity is about 5:1, comparable to that of the S&P 500. All of these measures are positive indications of financially healthy defense companies.

Ultimately, the defense industry's response to warfighting requirements in recent military engagements is the most important testimony to its health. The industry surged production of precision guided munitions to three to four times previous levels in less than a year. In addition, it delivered over 9,000 items to our combat forces on an expedited basis—in the case of the multi-spectral targeting system used in the armed Predator unmanned aerial vehicle, about 18 months ahead of the original contracted delivery date. And finally, myriad new products and innovative combinations of new products and legacy systems provided our warfighters distinctive combat advantages never before imagined.

Defense is a significant contributor to economic growth, and innovative defense companies of all sizes will continue to benefit from robust defense spending trends over the balance of this decade. The FY 2005 Defense Budget Request released by President Bush requested about \$401.7 billion in discretionary budget authority—a seven percent increase over FY 2004 funding levels. That budget continues our strong commitment to defense

transformation and force modernization. Within the defense budget, the procurement budget is \$74.9 billion—up 25 percent from \$60 billion in FY 2001. The research, development, test, and evaluation (RDT&E) budget is \$68.9 billion—up 68 percent from \$41 billion in FY 2001. This budget provides increased funding for such innovative and transformational programs as missile defense, unmanned aerial vehicles, spaced-based radar, satellite communications, tactical communications, and the Army’s Future Combat System. Robust funding for military portions of the aerospace industry will provide a solid foundation for its future health.

Department Responses to the Commission Report

The Department is actively engaged in several areas highlighted in the Commission report. Over the past two years, the Director, Defense Research and Engineering has led an interagency initiative known as the National Aerospace Initiative (NAI). The NAI is a collaborative and focused effort to coordinate technology and demonstrations in three key aerospace technology areas: high speed/hypersonic flight; access to space technologies; and space technologies.

In the past two years, the Department has also issued completely revised acquisition regulations that encourage and promote spiral development and incremental technology insertion. In addition, the Department has made programmatic changes to encourage a “try before you buy” approach to acquisition. In November 2003, the Department revised the charter of the Director, Defense Research and Engineering, adding responsibilities for “Advanced Capabilities and Prototyping” to the DDR&E portfolio which should result in greater prototyping.

The Department has a role in attracting inventors and engineering talent to the defense and aerospace industries. There are a number of “hard science” areas where the DoD provides

between one-third and one-half of all government-funded university research dollars in disciplines such as aeronautical engineering, mechanical engineering, electrical engineering, materials science, and computer science. In short, the Department actively helps to grow the human element of the aerospace sciences. Over the past year, the Department has also increased both the total number and annual stipend for its Graduate Science and Engineering Fellowship program—providing strong financial incentives to top science and engineering students.

Exciting projects funded by the Department also provide incentives for talented young people to enter our industry. Important scientific milestones in our recruiting repertoire include the Army hydrogen missile demonstration to achieve Mach 12 and the Falcon hypersonic vehicle to demonstrate controlled Mach 4 flight at approximately 100,000 feet.

In conclusion, the Department is using the tools at its disposal—its research and development and acquisition plans, its budgets, and its decisions—to focus market demand, provide incentives, and develop and sustain those technological, industrial, and human capabilities needed to fight and win wars in the 21st century.

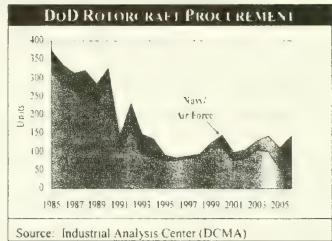
A Defense Industrial Base for 21st Century Warfighting

Although the Department firmly believes that our strong domestic industrial base and technology base are cornerstones of our national security and that the U.S. industrial base remains the strongest and most capable in the world, we constantly monitor its ability to meet the future demands of the warfighter. One of the sectors of the defense industrial base that we have been actively monitoring since 2001 is the rotorcraft industrial base.

The Rotorcraft Industry Snapshot: 1985 to Present

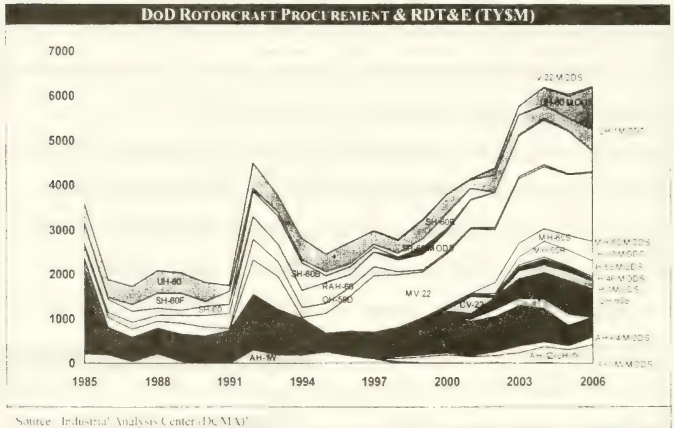
As the 21st century begins, the rotorcraft industrial base still is being shaped by government and industry responses to the Nunn-McCurdy cost breaches of 2001, and what the Department believes to be a “cartelization” of the industry. Over the next several years, this industry will be shaped by the operational experiences and associated refurbishment requirements for helicopters resulting from the global war on terrorism; in the longer term, it will be shaped by the Joint Staff’s new functional warfighting concepts.

Annual military helicopter demand peaked at 375 aircraft in 1985 and fell to 90 by 1996. The precipitous decline in helicopter production from 1992 to 1995, and few identified new program starts, reflected the disappearance of the threat from the Soviet Union, the assets on hand at that time, and the budgetary constraints of the Department after the end of the Cold War. To accommodate the realities of constrained acquisition budgets in the 1990s, the Military Services opted to remanufacture legacy platforms and focus development budgets on only two new start helicopter programs from the 1980s: the V-22 Osprey and RAH-66 Comanche. With the remanufacture of the AH-64, H-1, H-60, and CH-47 helicopters beginning in 1992, delivered units have ranged from 90 to 120 annually since 1998.



While the purpose of the Department’s remanufacture strategy was to constrain budgetary expenditures. This approach proved to be more costly than originally predicted. Coupled with enhanced combat capabilities/requirements, the Department realized substantial

increases in helicopter budgets from the 1985 trough as procurement accounts increased from \$3.5 billion to \$6.1 billion per year. For industry, high unit revenues associated with these remanufacture programs provided robust financial returns—with little incentive for innovation.



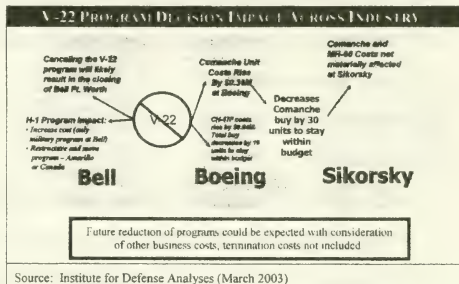
The Nunn-McCurdy Wake-up Call: 2001

2001 proved to be a year of reckoning for military helicopter programs. The Department's acquisition strategies of the 1980s and 1990s which focused on remanufacture programs sole-sourced to the original equipment manufacturers had resulted in cartel-like behavior in the rotorcraft industrial base. That is, there is little real competition among rotorcraft prime contractors since few contracts are competed; and they have formed industrial relationships among themselves that smooth revenue flow absent new program starts. Interlocking contractor teams, spanning across platforms, had long deprived the Department of

¹ Data includes budget submissions to date for the now cancelled Comanche program

maneuverability in decision-making. Any restructuring in a single program typically had consequences on other programs produced by teammates—often across the Military Services.

The V-22, produced in a teaming arrangement between Bell Helicopter and Boeing, is a case in point as the Comanche also was produced by Boeing—teamed with Sikorsky. If an attempt were made to



significantly change the scope or quantities of the V-22, administrative expenses or even the viability of the Comanche program could be affected, as shown in this graphic.²

Corporate executives of firms with helicopter companies or divisions also were not motivated to proactively manage their helicopter assets since these segments were generally small relative to overall corporate revenues and delivered above-average returns in most cases.

The impact of such cartel-like behavior became obvious when four helicopter programs—the H-1, CH-47F, V-22, and MH-60R—breached their 15 percent Nunn-McCurdy unit cost limits—virtually simultaneously—in 2001. In fact, helicopter programs accounted for four of the nine programs with cost breaches that year. This placed four of a total of only five Department-wide helicopter acquisition programs in breach status.

The Nunn-McCurdy Act requires that the respective Service Secretary notify Congress if a program experiences a greater than 15 percent increase to its acquisition or average

² The cancellation of Comanche can be expected to impact other parts of the rotorcraft industrial base. However, these impacts are expected to be more than offset by the ability to redeploy program cost savings to benefit 21st century warfighting capabilities.

procurement unit cost. With a greater than 25 percent unit cost increase, before a program can continue, the Secretary of Defense must **certify** for Congress that:

- (1) such acquisition program is essential to the national security;
- (2) there are no alternatives to such acquisition program which will provide equal or greater military capability at less cost;
- (3) the new estimates of the program acquisition unit cost or procurement unit cost are reasonable; and
- (4) the management structure for the acquisition program is adequate to manage and control program acquisition unit cost or procurement unit cost.

The Department viewed the unit cost breaches of the four major helicopter programs as a manifestation of a systemic problem within the rotorcraft industrial base.

To deal with the H-1 and CH-47F certification requirements, the Services and the Department's Cost Analysis Improvement Group (CAIG) developed new program cost estimates and reconfigured program management structures and incentives. These measures were designed to preclude future cost breaches. The Department continues to watch these programs closely, monitoring the prime contractors' management, manufacturing, and engineering performance. Cost, schedule, and performance challenges dictated that the Department resolve the Nunn-McCurdy issues methodically, but also as quickly as possible. Positive changes in the rotorcraft industrial base since 2002 have largely been limited to improved production efficiencies to meet restructured program cost targets.

Future Rotorcraft Opportunities

The industrial base on which the Department and 21st century warfighters will draw for manned—and increasingly, unmanned—helicopter requirements has had little incentive to

innovate over the past 20 years and is only now beginning to modernize as a result of remedial actions taken in conjunction with the Nunn-McCurdy cost breaches in 2001. Furthermore, significant battle damage repair and refurbishment required by Operation Iraqi Freedom and the robust backlog of the projected legacy remanufacturing business are not likely to spark great strides in innovation or invention in the industry.

In recognition of these issues within the rotorcraft industrial base, the Department has pressed the industry to institute lean manufacturing principles to improve cost-effectiveness. In addition, the Under Secretary of Defense for Acquisition, Technology, and Logistics' has chartered a task force to develop a roadmap for this industry sector and identify alternative courses of action. We believe reconstituting competition in this segment of the industry is necessary to respond to the Department's transformational concepts, such as Sea Basing. Still, today's pressing operational needs are encouraging a complacent domestic rotorcraft industry to focus on the lucrative near-term revenues from the remanufacture of legacy platforms and from after-market support.

At the same time, the Department's move toward a functional capabilities warfighting construct will challenge the legacy helicopter force mix and its associated industrial base to contribute to the capabilities required for 21st century warfighting. A study currently underway in the Office of the Deputy Under Secretary of Defense (Industrial Policy) will assess these issues in greater detail. The report is planned for release in the summer of 2004.

Assessing the Defense Industrial Base for 21st Century Warfighting Capabilities

In response to the Joint Staff's new functional capabilities requirements for 21st century warfare,³ the Department is adopting a different lens for viewing the defense industrial base: one

³ Chairman of the Joint Chiefs of Staff Instruction 3170.01C, "Joint Capabilities Integration and Development System," dated June 24, 2003.

organized around the most essential functional capabilities that the U.S. warfighter must deliver to be successful. The five initial functional concepts defined by the Joint Staff are: Battlespace Awareness, Command and Control, Force Application, Protection, and Focused Logistics. They are defined in the following table. With a new capabilities-based framework for the acquisition and requirements processes, the challenge for DoD decision-makers is to evaluate the industrial base within this new framework and with the new vernacular. We have begun this process by publishing the first of a five-series study on defense industrial base capabilities. This first study on Battlespace Awareness was pulished on January 1, 2004.⁴

JOINT STAFF FUNCTIONAL CONCEPTS ⁵	
Battlespace Awareness	Capabilities of commanders and all force elements to understand the environment in which they operate and the adversaries they face. It uses a variety of surveillance capabilities to gather information; a harmonized, secure, network-centric environment to manage this information; and a collection of capabilities to analyze, understand and predict. ⁶
Command and Control	Capabilities that exercise a commander's authority and direction over forces to accomplish a mission. It involves planning, directing, coordinating, and controlling forces and operations. It provides the means for a commander to recognize what is needed and ensure that appropriate actions are taken.
Force Application	Capabilities to engage adversaries with lethal and non-lethal methods across the entire spectrum of conflict. It includes all battlefield movement and dual-role offensive and defensive combat capabilities in land, sea, air, space, and information domains.
Protection	Capabilities that defend forces and U.S. territory from harm. It includes missile defense and infrastructure protection and other capabilities to thwart force application by an adversary.

⁴ This study, available on our website www.acq.osd.mil/ip assessed 357 *be ahead* and *be way ahead* capabilities, identifying 270 critical Battlespace Awareness technologies. Of the 270 critical technologies identified, initial assessments covered 31 applications of 24 priority technologies. Twenty-one assessed technologies and their applications and components were assessed to be sufficient. Issues were identified with the remaining three technologies: active hyperspectral imager, active electronically scanned array (AESA) radar, and maser clocks. The four initial follow-on studies will be completed by mid 2005.

⁵ The Joint Staff is developing a sixth functional capability: Net Centric Operations.

⁶ Embodied in this thinking is the decomposition of platforms into their enabling capabilities and assessing technologies in the functional capability area where their capabilities are most enabling. For example, major sensor suites associated with tactical aircraft and Navy combatants are assigned to Battlespace Awareness. The associated radars, missiles, and fire control assets would be allocated to Force Application. This decomposition of platforms into capabilities is at the heart of network-centric warfare and the new functional paradigm.

Focused Logistics

Capabilities to deploy, redeploy, and sustain forces anywhere in or around the world for sustained, in-theater operations. Includes the traditional mobility functions of airlift, sealift, and spacelift as well as short-haul (intra-theater and battlefield) transportation. It also includes logistics command and control, training, equipping, feeding, supplying, maintaining, and medical capabilities.

Source: Joint Staff Functional Concepts and ODUSD (IP)

The Department's move towards capabilities-based decision-making will fundamentally change the defense enterprise. How the Department looks at what it has and what it needs also will affect who participates in the defense industrial base.

Findings, conclusions, and recommendations from our ongoing assessment of legacy helicopter suppliers will address manned and unmanned rotorcraft industrial base capabilities within the context of the appropriate functional concepts. Our study also will assess major transformational programs currently underway for rotary wing requirements. For 21st century warfighting, it is most likely that rotorcraft solutions will make mostly unmanned contributions to battlespace awareness; unmanned and manned contributions to force application; substantial manned, heavy lift contributions to focused logisitics for troop transport—unmanned contributions for other resupply requirements. Going forward, the challenge for the rotorcraft industrial base will be to change and innovate as required to provide the functional capabilities required by 21st century warfighters.

Overall, we expect that the base of defense suppliers will broaden as the Department accesses smaller, innovative, emerging suppliers to solve difficult defense problems in this new functional capabilities concept. Additionally, because capabilities-based decision-making provides a common and comprehensive vernacular to operators, acquirers, and industry, this integrated vision should continue to improve the efficiency of resource and operational planning, and associated decision-making and program execution.

Conclusion

Thank you for the opportunity to discuss the Aerospace Commission report, the defense industrial base generally, and the rotorcraft portion of the defense industrial base specifically.

2005 NATIONAL DEFENSE AUTHORIZATION REQUEST

TESTIMONY
BEFORE THE HOUSE ARMED SERVICES COMMITTEE,
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
108TH CONGRESS

THE AVIATION INDUSTRIAL BASE AND THE
DEPARTMENT OF DEFENSE ROTORCRAFT INVESTMENT
PROGRAMS

March 4, 2004
9 a.m., Room 2118
Rayburn Office Building

Presented by
M.E. Rhett Flater
Executive Director
American Helicopter Society International

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**TESTIMONY
BEFORE THE HOUSE ARMED SERVICES COMMITTEE,
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES**

**THE AVIATION INDUSTRIAL BASE AND
DEPARTMENT OF DEFENSE ROTORCRAFT PROGRAMS**

**March 4, 2004
9 a.m., Room 2118
Rayburn Office Building**

**Presented by
M.E. Rhett Flater
Executive Director
American Helicopter Society International**

Mr. Chairman, my name is Rhett Flater and I am the Executive Director of the American Helicopter Society. It is a pleasure to appear before you today as you receive testimony on the fiscal year 2005 national defense authorization request and review United States' rotorcraft programs, the supporting industrial base and future technology initiatives.

The American Helicopter Society is the leading professional, technical society in the world dedicated to the advancement and promotion of vertical flight technologies, including the helicopter and tiltrotor. The Society was founded in 1943 by Igor Sikorsky and other industry pioneers, who recognized the benefits which vertical flight technologies offer mankind. Today, the Society is international in membership, with more than 6,000 members, most of whom are managers, engineers, scientists and technicians. Our membership also includes most large members of the U.S. rotorcraft industrial base, including airframe manufacturers Bell Helicopter Textron, Boeing Helicopter Division of Boeing Defense and Space Group, Sikorsky Aircraft Division of United Technologies, and Kaman Aerospace, engine manufacturers GE Aircraft Engines, Honeywell, and Rolls-Royce Corporation, and systems integrators BAE Systems, Honeywell, Lockheed Martin, Northrop Grumman and Raytheon.

I appear before you today to discuss the state of the United States rotorcraft industrial base, specifically as it relates to the ability of the industry to respond to future national and homeland security needs. More specifically, I wish to comment on the recent decision by the U.S. Army to terminate the Boeing-Sikorsky RAH-66 Comanche and the impact that decision will have on the domestic industrial base.

General Overview

In its 2004 world military forecast, updated since the termination of Comanche, Forecast International based in Newtown, Connecticut predicts that production of new-build military rotorcraft will rise in 2004 compared to 2003 and will continue to rise through 2011. In that year, Forecast International predicts that a total of 447 military rotorcraft will be produced, compared to the 318 expected to be built in 2004. The firm predicts that the value of this annual production, as measured in constant FY04 dollars will show an upward trend through 2012. The annual growth rate in production value will be considerably higher than the rate of growth in unit production. This is due to increased production of such relatively complex aircraft such as the V-22 Osprey and the NH-90. The value of military rotorcraft production in 2012 is projected to be \$9.9 billion, compared with \$4.4 billion forecast for 2004.

During the 2004-2013 time frame, Forecast International projects that a total of 3,960 new-build military rotorcraft will be produced. They expect this production will be worth an estimated \$73.7 billion. (By comparison, world civil rotorcraft production during the same time frame is valued at \$18.8 billion.)

These totals do not include major modification programs. During the next 10 years, Forecast International predicts a total of 1,414 major modifications, all military, with a value estimated at \$12.1 billion. Examples of such programs include the Bell AH-1Z and UH-1Y, the Boeing AH-64D and CH-47F, the Kaman SH-2G and the Sikorsky UH-60M.

The U.S. Helicopter Industrial Base

Currently, the U.S. helicopter industrial base consists of three major primes: Bell Helicopter Textron based in Fort Worth, Texas; Boeing's helicopter division based in Philadelphia and Mesa, Arizona; and Sikorsky Aircraft, a division of United Technologies Corporation, based in Stratford, Connecticut.

It also includes several engine manufacturers, e.g., GE Aircraft Engines based in Lynn, Massachusetts; Honeywell (formerly AlliedSignal) based in Phoenix, Arizona; and Rolls-Royce (formerly Allison) based in Indianapolis. In addition, it includes key suppliers, such as Kaman Corporation based in Bloomfield, Connecticut; Hamilton Sundstrand based in Windsor Locks, Connecticut; Goodrich Aerospace based in Charlotte, North Carolina; Lord Corporation based in Erie, Pennsylvania; Raytheon based in Arlington, Virginia; Moog, Inc. based in East Aurora, New York; Smiths Industries based in Grand Rapids, Michigan, and systems integrators such as Lockheed Martin (Owego, New York, and Orlando, Florida), BAE Systems (Vergennes, Vermont), Northrop Grumman (Baltimore, Maryland), Honeywell, and others.

The U.S. government invested substantial sums in basic rotorcraft research during the period 1960 – 1980 through vehicles such as the Army – NASA Joint Agreement on Rotorcraft Research Collaboration. Investments in engine technology during the 1970s produced the T700 engine which powers the Black Hawk and the Apache. This engine was ahead of its time and gave the U.S. medium lift capabilities unmatched by other countries for many years. But the once strong technical base for rotorcraft declined during the 1990s as government investment steadily dwindled. With NASA's unilateral determination in 2002 not to invest further in rotorcraft R&D, government investment has been reduced by half. Compounding the problem, NASA is in the process of closing RDT&E infrastructure, such as the National Full Scale Aerodynamics Complex (NFAC), essential to aeronautics, and rotorcraft research and development. The Army research community has therefore become isolated in its mission to broaden rotorcraft applications through improvements in performance (increased speed and payload, reduced empty weight, reduced noise and vibration) and safety. Industry continues to invest independent research and development funds in new designs such as the Collier Award-winning S-92 transport and the BA-609 civil tiltrotor as well as lean manufacturing technologies.

The Non-US Rotorcraft Industrial Base

While the U.S. is reducing its investment in rotorcraft research and related test and evaluation infrastructure, just the opposite is happening in other countries. The EU, as part of its Sixth Framework Initiative, has recently doubled its investment in aeronautics, including rotorcraft research, and related test and evaluation facilities. Several European airframe manufacturers now have capabilities comparable to those of U.S. companies. The most technically advanced of these is Eurocopter, an EADS company based in Marignane,

France, and Donauwoerth, Germany. Eurocopter, which grossed nearly \$2.9 billion in 2002, played a leading role in designing, building and fielding the NH-90, an advanced, medium-lift transport featuring an all-composite airframe, fly-by-wire control technology, and a second-generation bearingless-main-rotor system. It also builds the Tiger, a medium reconnaissance / attack helicopter also featuring fly-by-wire controls and a bearingless main rotor system (the Tiger recently won two international competitions in Spain and Australia); and a full line of military and civil helicopters for every market niche except heavy lift (only the U.S. has invested in modern heavy lift capabilities). Italy's Agusta and England's GKN Westland have teamed to produce the EH-101, a medium lift advanced transport helicopter now in service in nine countries in Europe and North America (Canada). Lockheed Martin is proposing a U.S. version of the same aircraft for the White House's presidential helicopter replacement. Russia's Mil Design Bureau designed and built the Mi-26, a relatively low-technology (1970s) airframe capable of lifting extremely heavy payloads, in excess of 44,000 pounds. Meanwhile, Japan, China and India continue to increase investments in their respective rotorcraft industrial bases with the desire to fulfill any shortfall in U.S. or world needs.

Compared to the U.S., European host governments consistently, and heavily, subsidize rotorcraft research and development. In *Vision 2020*, the European Commission lays out its plan to dominate the world aerospace industry, including rotorcraft, and its willingness to achieve that goal by funding its industrial base research. Rotorcraft research funding in France is supplied by the military (64%) and by the civil (36%) sectors of the government. Of these funds, 34% support basic research and 66% technology and development programs. The European Union supplements its member state basic R&D funds via European Commission "framework programs." European government test facilities are modern to state-of-the-art compared to those in the U.S. Examples include the DNW (Netherlands) wind tunnel, CIRA's (Italy's) new crash test facility and icing wind tunnel, both located at Padua. Russia's TsAGI has three large low speed tunnels that are used extensively for studies of helicopter rotors and complete configurations, e.g., the T-101, T-104 and T-105. As the **Commission on the Future of the United States Aerospace Industry** recently reported, "in contrast to declining NASA and FAA funding, framework funding has increased dramatically since 1987." EU supplemental funding for aeronautics research jumped to more than \$1.5 billion in the sixth EU framework program (2002-2006). This is in addition to even larger investments made by individual countries such as France, Germany, England and Italy, and government agencies supporting various economic regions in Europe.

There are also a number of new centers of rotorcraft excellence emerging beyond Europe, again with the help of government funding. These include the helicopter industries of India, China, Japan and Korea. Closer to home, Canada also continues to support home-grown rotorcraft technology development through its TPC funding programs.

The State of Basic Rotorcraft Research in the U.S.

Attached as Appendix #3 is the Society's best estimate of the state of DoD rotorcraft science and technology and NASA research and technology programs for the period 1994 through 2004, with projections for fiscal years 2005 through 2007. Please note that during the period from 2001 through 2003, rotorcraft research performed by DoD and NASA declined from \$113.6 million to \$56.3 million, largely because of NASA's failure to fund rotorcraft research.

Long-term cooperative efforts between NASA and the Department of Defense in rotorcraft research, in particular the 1969 Army NASA Joint Agreement, are in serious turmoil. Facing internal budget pressures, NASA eliminated all of its rotorcraft R&D activity in fiscal year 2002. Effective 2003, however, NASA restored funding for rotorcraft but only to \$15 million annually as part of its Vehicle Systems Technology program. In the face of a growing European rotorcraft industry, the future competitiveness of U.S. capabilities in both military and commercial rotorcraft technology development is in jeopardy. If the trend continues, the U.S. Defense Department may eventually become dependent on non-U.S. suppliers for future mobility requirements. In its Third Interim Report, the **Commission on the Future of the U.S. Aerospace Industry** ("the Commission") issued a recommendation that "the Administration and Congress should direct NASA and the DoD to coordinate R&D efforts in areas of common need and provide the appropriate funding for joint programs. For example, funding for joint Army/NASA rotorcraft R&D efforts should be restored." See Commission Recommendation 5.

The rotorcraft industry is a significant part of the U.S. aerospace industrial base. Several findings by the **Commission on the Future of the U.S. Aerospace Industry** regarding the industrial base are especially relevant to the rotorcraft industry. For example:

- There is a major workforce crisis in the aerospace industry. Our nation has lost over 600,000 scientific and technical aerospace jobs in the past

13 years. These layoffs initially began as a result of reduced defense spending following the end of the Cold War. But subsequent contraction of the industry through mergers and acquisitions and the events of September 11 have made the situation worse.

- Aerospace is a technology-driven industry, heavily dependent on defense, research and manufacturing. Yet aerospace procurement by the military fell nearly 53 percent from 1987 to 2000. The DoD also reduced its overall investment in research, development, testing and evaluation by nearly 20 percent from 1987 to 1999. The recent decision by the Army to terminate the RAH-66 Comanche program will exacerbate this decline unless Congress reallocates the \$14.6 billion which would have been spent on Comanche to Army aviation transformation accounts.
- Maintaining a world-class national aerospace RDT&E infrastructure is essential to ensure that this country's research programs can be performed successfully. Yet much of the U.S. RDT&E infrastructure is 40 to 50 years old and marginally maintained. Currently, NASA has suspended all operations of the 40x80 Foot and 80x120 Foot wind tunnels, known as the National Full Scale Aerodynamics Complex, located at NASA Ames and threatens to close it permanently effective September 30, 2004. This is a significant blow to the rotorcraft industry which depends on full-scale testing and access to NASA RDT&E test facilities. In addition, NASA has closed the nation's only crash-safety flight test facility located at NASA Langley. Accordingly, crash safety tests planned for existing and future U.S. aerospace industry products must now be performed in European facilities or cancelled altogether.
- Industry-funded aerospace research and development fell by 37 percent from \$8.1 billion in 1986 to \$5.1 billion in 1999 (in inflation adjusted dollars). Absent government procurements, private firms have little incentive to fund basic research on their own because capital markets and stockholders shy away from risky investments with indeterminate returns.
- During the same timeframe, the number of major U.S. aerospace prime contractors shrank from more than 50 to just five. Meanwhile, aerospace firms continue to consolidate to maximize resources, eliminate excess capacity, and access new market segments. Parts suppliers have undergone a similar contraction and consolidation.

Given (1) the loss in U.S. rotorcraft market share brought about by the decline in U.S. investment (NASA, DoD, and Industry) in basic research; (2) the termination of the Boeing-Sikorsky RAH-66 Comanche and the corresponding loss of investment in rotorcraft research and development; and (3) the availability of equivalent or better European technology supported by aggressive R&D programs with the stated objective of overtaking the U.S. in rotorcraft sales, it should be clear that the U.S. government must support sustained research. Specifically, the DoD and NASA must provide sustained and predictable investments in basic aeronautics research, including rotorcraft. If this does not occur, the U.S. rotorcraft capability - until recently regarded as the best in the world - will cease to be competitive in world military markets.

The Decision to Terminate the RAH-66 Comanche And Its Impact on the Domestic Rotorcraft Industrial Base

The U.S. Army on February 23, 2004 announced its decision to terminate the Boeing-Sikorsky RAH-66 Comanche Program. The program was conceived nearly 20 years ago and in recent tests it has performed well demonstrating revolutionary new capabilities. Boeing and Sikorsky and other members of the industrial base were already producing EMD aircraft and were poised to begin production of 650 Comanche aircraft which would have performed manned, armed, deep reconnaissance and surveillance missions for the service. Unfortunately, the Army has determined that the world's operating environment and its own priorities have changed since Comanche was conceived in 1983 and that it must restructure Army aviation immediately. To fund this restructuring, Comanche must be ended. The Society understands that President Bush and Defense Secretary Rumsfeld have approved the Army's recommendation to submit an amendment to the previously submitted FY05 budget request that reflects the Comanche program cancellation and other changes.

According to the Army, termination of the Comanche program enables the reallocation of approximately \$14.6 billion that had been slated for Comanche to other Army aviation efforts in the FY04 – FY11 time period. The funds will be used to underwrite procurement of Block III Apaches, which will give Apache the same fire control radar, and the same digital connectivity, that the Comanche would have had. The Army will procure additional CH-47F Chinooks and UH-60M Black Hawks, plus 368 new armed reconnaissance helicopters and up to 303 light utility helicopters. Some of the technologies developed for Comanche will be "migrated" to existing airframes in future

upgrades. For example, the Army will introduce fly-by-wire capabilities to its Apache and Black Hawk fleets. Chinooks and Black Hawks will be given common cockpits. In sum, the service will buy 796 new aircraft and recapitalize 1,400 existing aircraft. Finally, the Army is considering investing in a new Joint Multi-Role helicopter, which might possibly be a Joint VTOL Heavy Lift aircraft capable of delivering payloads such as the Future Combat System to distant battlefields. While this Joint Multi-Role helicopter is not believed to be part of the Army's immediate plan for the use of former Comanche funding, it nevertheless is under consideration as a possible future "new start."

Whether this will happen – and it is vital to the future of Army aviation that it happen – will depend on the continued support of the Bush Administration and the Department of Defense, but most importantly it will depend on the wishes of the United States Congress. The Society strongly endorses the Army's plan and urges Congress to "fence off" the entire \$14.6 billion investment which would have been made in Comanche for the purpose of supporting Army aviation transformation.

Before closing on this topic, let me offer the comments of several knowledgeable observers.

Dr. Robert F. Loewy, the current Chairman of AHS International and also William R.T. Oakes, Jr. Professor and Chair, School of Aerospace Engineering, Georgia Institute of Technology, observed in a recent communication to me:

"If there are sound reasons for man in space, as part of a program of exploration, there must be still more reasons for manned airborne systems, considering the limitless abilities of an enemy to adapt to whatever technologies we develop. Experienced warfighters know that flexibility in our ability to respond is always essential. UAV's may be great in many respects, but they are unlikely to be as flexible, regarding the unexpected, as a manned helicopter. Comanche is generations ahead of military aircraft currently being fielded by the U.S., and if we are to have technologies comparable to the NH-90 and the Eurocopter Tiger, we had better field a new generation rotorcraft or be ready to be second class."

Here's another comment which appears as a recent editorial in the highly-respected magazine, **Aviation Week & Space Technology**:

‘The decision to terminate Comanche is a high-stakes gamble on the Pentagon’s part. And riding along on the roll of the dice will be the future of the U.S. rotorcraft industry. While the Pentagon’s plan calls for a slew of programs, most are upgrades or refurbishments. These alone will not provide the engineering challenge to keep a robust helicopter industry alive. The U.S., in recent years, has shown little support for its helicopter industrial base, but it may be too early to discard the notions of future helicopters altogether – unless Congress wants to buy them in Europe.

To minimize the risk to the industrial base, a new development should be started quickly. The Army needs an intra-theater transport to move Future Combat System equipment. But funding for the effort has lagged. The requirement exists, so this doesn’t have to be a subsidy that serves no direct national security purpose. And this is a niche where industrial need and military requirements overlap.

Paradoxically, killing Comanche offers an opportunity to revitalize the U.S. military rotorcraft sector. But it is a high-risk strategy that will require both government and industry to avoid almost any misstep.”

In sum, the domestic helicopter industrial base is currently sound, but the loss of the Comanche places it at risk unless former Comanche funding is retained and applied to current Army aviation needs. Let there be no question. The Army’s termination of the Comanche will directly impact a large portion of the rotorcraft industrial base, more than 300 subcontractors, in addition to Sikorsky Aircraft and Boeing and engine manufacturers Rolls-Royce and Honeywell. Unless a competitive new start program is initiated near term, the loss of Comanche and subsequent drop in the subcontractor labor base will adversely affect other unrelated programs, such as the V-22 Osprey and the CH-53E Sea Stallion.

Why a U.S. Rotorcraft Industrial Base Is Needed

NASA’s withdrawal since fiscal year 2002 from rotorcraft research, and the loss of access to NASA RDT&E facilities, has compromised the future competitiveness of the U.S. rotorcraft industry. The recent closure of the NFAC (NASA’s 40x80 foot and 80x120 foot windtunnels) has interrupted further testing of revolutionary rotary wing technologies, specifically individual blade control combined with “smart” materials. Meanwhile, the European Union and Eurocopter continue to conduct tests using similar technologies at the German – Dutch DNW wind tunnels located near Amsterdam.

The principal arguments supporting the need for sustaining a U.S. rotorcraft industrial base are stated below. While the arguments are stated primarily in terms of the U.S. airframe community, they apply equally to the engine and systems communities, as well as the supplier base.

1. **Maintaining a U.S. rotorcraft industrial base supports an independent U.S. foreign policy.** Rotorcraft or low disk-loading aircraft capable of vertical take off and landing in austere environments have proven to be essential assets in fighting asymmetric, three-dimensional, non-battlefront centric, modern wars. They are the only VTOL vehicles capable of providing practical and affordable solutions to military needs for utility transport, cargo, combat search and rescue, reconnaissance and surveillance, and close-in attack. They are critical to 21st century military transformation efforts focused on developing lighter, more mobile, more lethal, and more agile military combat capabilities.
2. **Maintaining a U.S. helicopter industrial base is essential to preserve the ability to perform emergency upgrades, provide instant modifications and sustain the current 6,000 airframe-plus existing U.S. military helicopter fleet in the field.** Because of their complexity, high vibration, and heavy loading, helicopters are maintenance-intensive vehicles, requiring constant support in the field in order to assure high combat availability. In addition, many combat environments require that the fleet undergo emergency upgrades to address adverse local conditions, such as Afghanistan's hot-high environment or the sandstorms of Iraq, or new threats on the battlefield. Engine and rotor system instant modifications are frequently required to enable military helicopters, such as the CH-47 Chinook, the CH-53 Sea Stallion, the AH-64 Apache, the AH-1 Cobra, the OH-58 Kiowa Warrior and the UH-60 Black Hawk, to operate in such environments. Access to a stable, secure and reliable domestic industrial base, which cannot be compromised by disagreements within the international community, is essential to meeting the needs for flight safety, technical expertise, quality control, and quality spares in a timely and effective manner.
3. **The failure to maintain a U.S. helicopter industrial base could have a significant impact on non-DoD domestic and foreign policy initiatives, such as homeland defense, the U.S. Coast Guard, the**

Global War on Terrorism, disaster response, and medical evacuation. In all such initiatives, helicopters perform roles which fixed-wing aircraft and ground transportation are not capable of executing in a safe and timely manner – roles which only helicopters can perform.

4. **The failure to maintain a U.S. helicopter industrial base could compromise advanced combat systems embedded in modern helicopter airframes, such as advanced low-observable technology, countermeasures, and sensor capabilities.** Dependence on a non-U.S. industrial base for design, sustainment and aftermarket support might compromise the ability to protect sensitive technologies and capabilities purchased by the DoD with U.S. taxpayer funds.
5. **The development of new requirements for heavy lift replacement could assure the development of advanced technology that would preserve the future of the U.S. rotorcraft industrial base.** Such an effort would include possibilities for classical rotorcraft, advanced compound rotorcraft configurations, tiltrotor and tiltwing aircraft to meet any such requirement. U.S. national security needs are likely to impose unique requirements on our military posture, such as strategic mobility and world-wide operations without fixed bases. A case in point is that only the U.S. and Russia have developed heavy lift helicopters and only the U.S. has developed tiltrotor aircraft. A new initiative for heavy lift might achieve results similar to those the DoD successfully accomplished in the case of the Joint Strike Fighter and U.S. military fighter industrial base. (Note that the core lift design and aerodynamics R&D efforts were allocated to U.S. firms rather than the international partners.)
6. **Maintaining a strong civil helicopter industrial base supports national security as well as the U.S. economy.** Not only do U.S. manufacturers provide rotorcraft for the U.S. defense market, but both Bell Helicopter and Sikorsky Aircraft also manufacture helicopters for the civil market and foreign military sales. Boeing has exited the civil market, but participates heavily in foreign military sales, which has largely sustained the CH-47 Chinook production line through the 1990s. Civil market and FMS sales support the U.S. helicopter industrial base, including skilled technicians and a capable research, engineering, development, test and evaluation community (technology is “people”), as well as the necessary manufacturing infrastructure to build helicopters,

particularly during times when cyclical defense needs are at a low ebb. The helicopter industrial base which supports civil market requirements is largely the same base which supports military needs. Stated more emphatically, there can be no military helicopter industrial base without a civil helicopter industrial base. Conversely, given the rapid pace of technology advancement in our industry, there can be no viable civil turbine helicopter industry without a viable military industrial base. From a macroeconomic perspective, civil helicopter exports and foreign military sales of helicopters and helicopter spares support the U.S. economy, create high-paying skilled jobs, and contribute positively to U.S. international trade balances.

The decision whether to sustain a domestic rotorcraft industrial base should be made soon, since the failure to make a decision, or to modify current government policies, will contribute to the continued erosion of the U.S. rotorcraft industrial base during the coming decade. The loss of specific aerospace industrial bases and capabilities (or, stated another way, the transfer of the aerospace industrial base abroad) has proven irreversible during the past 10 to 20 years. The United States has ceded leadership – and any continuing role – in the market for regional, commuter jets. Canada's Bombardier and Brazil's Embraer now dominate that market. Similarly, Airbus in recent years has overcome Boeing's lead in large commercial aircraft and currently enjoys a 50 percent or greater market share. By comparison, the DoD made a decision in the early 1990s to assume a lead role in developing the Joint Strike Fighter and made appropriate R&D and S&T investments to assure that result. As a result, today the U.S. military fighter industrial base dominates the world military fighter market.

Investments in Rotorcraft Technology Needed

There are a number of areas in which further investment in rotorcraft technology is needed by DoD and NASA.

- **Concepts for innovative new configurations** can radically improve rotorcraft speed, affordability, and mission effectiveness, while retaining superior VTOL and low-speed characteristics.
- **Applications of information and computing technologies** will result in safer, more affordable, environmentally-friendly rotorcraft and far more effective and survivable military systems. These technologies can enable safe near all-weather operation in confined urban areas,

particularly important for scheduled transport and public service operations.

- **Active and adaptive controls** have demonstrated the potential to improve performance, and reduce external noise, internal noise, vibration, and weight and mechanical complexity.
- **Noise reducing design and operational methods** have demonstrated noise reductions totaling 20 dB (i.e., 75% reduction), but continued research is needed to achieve this for future rotorcraft configurations.
- **New design tools** can reduce development cycle time by 50%, speeding up the application of technology improvements. These include physics-based models, such as advanced structural analysis and computational fluid dynamics, that lead to improved performance, noise, and vibration characteristics. These methods are needed to optimize designs and to “get it right the first time,” avoiding costly redesign and retest, particularly for innovative aircraft configurations.
- **Deice and anti-ice concepts and certification methods** are needed for affordable and reliable all-weather operation. Operation of rotorcraft in icing conditions currently requires complex (hence costly and sometimes unreliable) systems and is difficult, costly, and time consuming to certify for civil operation.

Future research addressing these barrier technologies will bring about radical improvements that will achieve the characteristics needed to contribute to national security as well as the air transportation system of the future.

Conclusion

Companies such as Bell, Boeing and Sikorsky and their supporting suppliers are innovative. They also have responsive, can-do senior managers and proven, experienced management teams which partner well with their customer. When called upon, they are capable of responding with alacrity to national security and civil market needs.

In conclusion, I wish to make four recommendations.

- First, Congress and this Committee should support the Army’s plan to redirect the approximately \$14.6 billion originally slated for Comanche to meet current and future needs of Army aviation transformation during Fiscal Years 2005 – 2011.

- Second, the DoD and NASA should be directed to make further investments in basic 6.1 and 6.2 rotorcraft research – particularly efforts to refine and simplify the rotor system, control systems and the drive train - a high priority.
- Third, given the importance of transforming the U.S. military to become more mobile and more agile – a requirement in fighting future 21st century wars - the DoD should fund private industry to design, develop and fly a series of innovative VTOL prototype aircraft.
- Fourth, this Committee should pay particular heed to implementing the recommendations of the **Commission on the Future of the U.S. Aerospace Industry** contained in the Commission's Final Report issued November 17, 2002 highlighted in Appendix 2 to this testimony.

Reallocation of the entire unused \$14.6 billion investment in Comanche to address major shortfalls in Army aviation capabilities and rapid passage of the "Aeronautics Revitalization Act of 2005," which has broad, bipartisan support, would go far in addressing these national concerns.

Thank you, Mr. Chairman.

**Rotorcraft Industry Trends
For the Period 1993 - 2003**

<u>Year</u>	<u>Total Employees</u>	<u>Total Revenues (Billions US)</u>
1993	28,293	\$5.086
1994	27,606	\$5.121
1995	26,190	\$5.445
1996	25,821	\$4.632
1997	27,526	\$4.505
1998	27,214	\$5.048
1999	25,534	\$5.072
2000	24,899	\$5.482
2001	25,324	\$5.865
2002	24,182	\$6.616
2003	24,916	\$6.388

* Includes total revenues and employees for the years ending December 31, 1993 through December 31, 2003 for Bell Helicopter Textron, The Boeing Company (rotorcraft revenues only), McDonnell Douglas Helicopter Company (1993-1996), and Sikorsky Aircraft Corporation.

Stakeholder's Coalition
"Final Report of the Commission on the
Future of the U.S. Aerospace Industry"

Summary Findings
Research and Development Committee

The Stakeholder's Coalition R&D Committee has identified several key recommendations relating to the need for national R&D goals contained within the Final Report of the Commission on the Future of the U.S. Aerospace Industry, consolidated, reworded and modified as follows:

1. The White House and Congress must increase and sustain funding in long-term research and associated RDT&E infrastructure to develop and demonstrate new breakthrough aerospace capabilities. (Rec. #123; Com. Rep. at 9-8 and 9-12; see also Rec. #111; Com. Rep. at 4-6)
 - (a) NASA should reenergize its aeronautics research efforts and, within the next five years, double its investment in aeronautics. (Rec. #9; Com. Rep. at 9-3, 9-11, 9-13; Rec. #123; Com. Rep. at 9-8 and 9-12)
 - (b) The Federal government must assume responsibility for providing, sustaining, and modernizing critical aerospace RDT&E infrastructure to ensure that this country's research programs can be performed successfully. (Rec. #116; see Com. Rep. at 4-12 and 4-14; Rec. #123; Com. Rep. at 9-7 and 9-12.)
 - (c) DoD's annual science and technology (6.1-6.3) funding must be sufficient (not less than 3 percent DoD obligation authority) and stable to create and demonstrate the innovative technologies needed to address future national security threats. (Rec. #113; see Com. Rep. at 4-7.)
 - (d) The Administration and Congress should direct NASA and the DoD to coordinate R&D efforts in areas of common need and provide the appropriate funding for joint programs. (Rec. #24; Com. Rep. at B-39.)

2. Industry and government should accelerate research transition reducing the time from concept definition to operational capability by 75 percent through coordinated national goals; aggressive use of information technologies; incentives for real government, industry, labor, and academia partnerships; and an acquisition process that integrates science and technology as part of the product development process. (Recs. # 103, 104, and #8; Com. Rep. at 9-10/12).
3. To focus U.S. aerospace research investments on developing breakthrough capabilities, the Administration should adopt – as a national priority – the achievement of the following aerospace technology demonstration goals by 2010
 - Demonstrate an automated and integrated air transportation capability that would triple air system capacity by 2025;
 - Reduce aviation noise and emissions by 90 percent;
 - Reduce aviation fatal accident rate by 90 percent;
 - Reduce transit time between any two points on earth by 50 percent.
 - Reduce cost and time to access space by 50 percent;
 - Reduce transit time between two points in space by 50 percent;
 - Demonstrate the capability to continuously monitor and surveil the earth, its atmosphere and space for a wide range of military, intelligence, civil and commercial applications;

(Rec. 8; Com. Rep. at 9-8)

Other Committee Items of Interest:

As the Commission found, “there is a workforce crisis in the aerospace industry” which must have access to a scientifically and technically trained workforce. The recommendations of the Commission relating to “Workforce” contained at Chapter 8 of the Final Report are of considerable importance to the future health of U.S. R&D, particularly recommendations #22, #23, #118, #119, and #122.

Kathryn Holmes, ASME
M.E. Rhett Flater, AHS Int'l
Co-chairs, R&D Committee

DoD and NASA Dual-Use Rotorcraft Investment

		FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07
--- DoD															
Army 6 ¹	\$8.40	\$8.20	\$7.59	\$8.41	\$7.85	\$8.49	\$8.49	\$9.43	\$9.92	\$9.74	\$12.08	\$12.29	\$12.47	\$13.00	\$13.19
Army 6.2 ²	\$18.50	\$17.90	\$17.44	\$20.70	\$23.30	\$22.14	\$23.49	\$20.84	\$20.74	\$20.31	\$24.48	\$26.46	\$26.57	\$23.76	\$22.77
Army 6.3 ³	\$17.40	\$17.30	\$17.72	\$17.34	\$18.64	\$23.49	\$23.49	\$20.84	\$20.80	\$30.52	\$20.06	\$27.48	\$24.65	\$20.66	\$24.75
DoD Bridge										\$12.50					
DARPA						\$4.70	\$3.90	\$5.35	\$6.40						
Navy (JHUMS)						\$4.00	\$4.00	\$3.50	\$2.60	\$1.70					
DoD Total	\$44.30	\$43.40	\$43.15	\$46.45	\$58.49	\$62.02	\$59.96	\$50.46	\$50.46	\$74.77	\$56.62	\$66.24	\$63.79	\$57.42	\$60.71
--- NASA															
NASA - Base Program															
Original Program	\$35.10	\$34.20	\$33.40	\$32.50	\$32.60	\$27.20	\$26.92	\$26.65	\$26.65	\$0.00					
Congressional Earmark									\$5.00	\$12.50					
Total Base Program	\$35.10	\$34.20	\$33.40	\$32.50	\$32.60	\$27.20	\$26.92	\$26.65	\$31.65	\$12.50					
SHCT	\$3.40	\$7.60	\$7.30	\$11.20	\$10.10	\$8.90	\$8.20	\$8.20	\$3.40	\$0.00					
(N)Salary (est)	\$20.00	\$19.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00					
NASA Total (w/o Larsen)	\$58.50	\$60.80	\$58.70	\$61.70	\$60.70	\$54.10	\$53.12	\$53.05	\$30.50	\$30.50	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
NASA Salary Projection											\$18.00	\$19.00	\$20.00	\$21.00	\$22.00
Larsen Bill Funding											\$18.00	\$40.00	\$40.00	\$40.00	\$50.00
NASA Total (w/Larsen)	\$58.50	\$60.80	\$58.70	\$61.70	\$60.70	\$54.10	\$53.12	\$53.05	\$30.50	\$30.50	\$18.00	\$59.00	\$50.00	\$61.00	\$72.00
National Program (w/o Larsen)	\$102.80	\$104.20	\$101.85	\$108.15	\$119.19	\$116.12	\$113.08	\$113.08	\$113.51	\$105.27	\$56.62	\$66.24	\$63.79	\$57.42	\$60.71
National Program (w/Larsen)	\$102.80	\$104.20	\$101.85	\$108.15	\$119.19	\$116.12	\$113.08	\$113.08	\$113.51	\$105.27	\$74.62	\$125.24	\$123.79	\$118.42	\$132.71

¹Totals from A91A & AH45; 75% of AH42, AH66, and AF20 from ARL support, and RCOE portion of BH59.

²Total of A47A minus militarization specific workpackages & inclusive of NRTC.

³Total of selected Projects from Programs D313, D447, and D436.

(Dollars are adjusted from DoD totals to reflect only Dual-Use Technologies. Militarization items such as signature suppression, weapons, sensors, and 45 percent of situational awareness are omitted. Totals are rounded to nearest 10K).

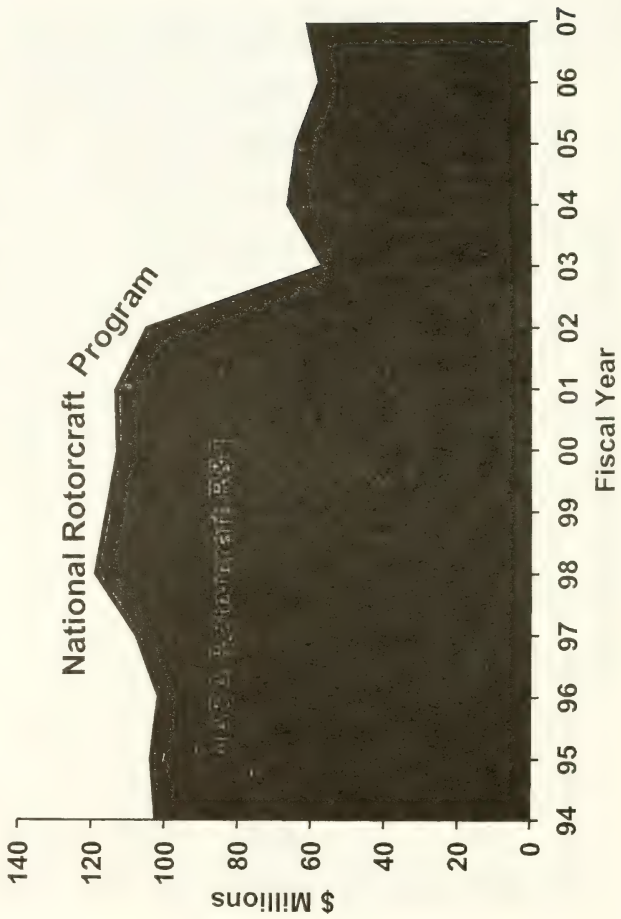
DoD and NASA Dual-Use Rotorcraft Investment

(\$ Million)	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06	FY07
Army 6.1 Funding														
A31A						\$1.22	\$1.61	\$1.65	\$1.59	\$2.88	\$3.46	\$3.51	\$3.67	\$3.68
AH45						\$1.84	\$1.88	\$1.97	\$1.94	\$2.19	\$2.23	\$2.27	\$2.35	\$2.40
AFDD Subtotal						\$3.06	\$3.49	\$3.62	\$3.53	\$5.07	\$5.69	\$5.78	\$6.02	\$6.08
75% of AH42						\$1.22	\$1.30	\$1.47	\$1.52	\$1.62	\$1.66	\$1.69	\$1.79	\$1.83
75% of AH86						\$0.88	\$1.03	\$1.08	\$1.12	\$1.26	\$1.25	\$1.27	\$1.35	\$1.39
75% of AH84						\$7.48	\$9.52	\$8.55	\$10.25	\$13.89	\$12.66	\$12.77	\$12.90	\$13.60
75% of AF20						\$1.53	\$1.82	\$1.85	\$1.94	\$2.13	\$1.69	\$1.73	\$1.84	\$1.89
ARL Subtotal w/AH84						\$11.11	\$13.76	\$12.95	\$14.83	\$19.00	\$17.26	\$17.46	\$17.88	\$18.71
ARL Subtotal w/o AH84						\$3.63	\$4.24	\$4.40	\$4.58	\$5.01	\$4.60	\$4.69	\$4.98	\$5.11
AFDD + ARL Subtotal w/AH84						\$14.17	\$17.25	\$16.57	\$18.36	\$24.07	\$22.95	\$23.24	\$23.90	\$24.79
AFDD + ARL Subtotal w/o AH84						\$6.69	\$7.73	\$8.02	\$8.11	\$10.08	\$10.29	\$10.47	\$11.00	\$11.19
RCOE portion of BH59	\$2.00	\$2.00	\$1.94	\$1.95	\$1.50	\$1.80	\$1.70	\$1.90	\$1.63	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00
Grand Total (w/AH84)	\$2.00	\$2.00	\$1.94	\$1.95	\$1.50	\$15.97	\$18.95	\$18.47	\$19.99	\$26.07	\$24.95	\$25.24	\$25.90	\$26.79
Grand Total (w/o AH84)	\$8.40	\$8.20	\$7.99	\$8.41	\$7.85	\$8.49	\$9.43	\$9.92	\$9.74	\$12.08	\$12.29	\$12.47	\$13.00	\$13.19
Rotorcraft Centers of Excellence														
Army (BH59)	\$2.00	\$2.00	\$1.94	\$1.95	\$1.50	\$1.80	\$1.70	\$1.90	\$1.63	\$2.00	\$2.00	\$2.00	\$2.00	\$2.00
NASA			\$0.40	\$0.32	\$0.84	\$0.60	\$0.40	\$0.50	\$0.67	\$0.30	\$0.30	\$0.30	\$0.30	\$0.30
Total	\$2.00	\$2.00	\$2.33	\$2.27	\$2.34	\$2.40	\$2.10	\$2.40	\$2.30	\$2.30	\$2.30	\$2.30	\$2.30	\$2.30
FAA						\$0.00	\$0.20	\$0.80	\$0.40	\$0.80				

DoD and NASA Dual-Use Rotorcraft Investment

Data for Charts (from above calculations and inputs)													
Chart 2													
	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06
DoD -- S&T	\$44.3	\$43.4	\$43.1	\$46.5	\$58.5	\$62.0	\$60.0	\$60.5	\$74.8	\$56.6	\$66.2	\$63.8	\$57.4
NASA -- Salary	\$20.0	\$19.0	\$18.0	\$18.0	\$18.0	\$18.0	\$18.0	\$18.0	\$18.0	\$0.0	\$0.0	\$0.0	\$0.0
NASA -- Base R&T	\$38.5	\$41.8	\$40.7	\$43.7	\$42.7	\$36.1	\$35.1	\$30.1	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
NASA -- Congressional Plus-Up	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$5.0	\$12.5	\$0.0	\$0.0	\$0.0	\$0.0
Army													
DoD Only	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06
Army 6.1	\$8.4	\$8.2	\$8.0	\$8.4	\$7.8	\$8.5	\$9.4	\$9.9	\$9.7	\$12.1	\$12.3	\$12.5	\$13.2
Army 6.2	\$18.5	\$17.9	\$17.4	\$20.7	\$23.3	\$22.1	\$20.8	\$20.7	\$20.3	\$24.5	\$26.5	\$26.7	\$23.8
Army 6.3	\$17.4	\$17.3	\$17.7	\$17.3	\$18.6	\$23.5	\$20.8	\$20.8	\$30.5	\$20.1	\$27.5	\$24.6	\$20.7
DARPA	\$0.0	\$0.0	\$0.0	\$0.0	\$4.7	\$3.9	\$5.4	\$6.4	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
Navy (JHUMS)	\$0.0	\$0.0	\$0.0	\$0.0	\$4.0	\$4.0	\$3.5	\$2.6	\$1.7	\$0.0	\$0.0	\$0.0	\$0.0
DoD Bridge	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$12.5	\$0.0	\$0.0	\$0.0	\$0.0
NASA													
NASA Only	FY94	FY95	FY96	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04	FY05	FY06
NASA -- Salary	\$20.0	\$19.0	\$18.0	\$18.0	\$18.0	\$18.0	\$18.0	\$18.0	\$18.0	\$0.0	\$0.0	\$0.0	\$0.0
NASA -- Base R&T	\$38.5	\$41.8	\$40.7	\$43.7	\$42.7	\$36.1	\$35.1	\$30.1	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
NASA -- Congressional Plus-Up	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$5.0	\$12.5	\$0.0	\$0.0	\$0.0	\$0.0
NASA Salary Projection										\$18.0	\$19.0	\$20.0	\$22.0
Larson Bill Funding										\$40.0	\$40.0	\$40.0	\$50.0
Total													
DoD -- S&T	\$44.3	\$43.4	\$43.1	\$46.5	\$58.5	\$62.0	\$60.0	\$60.5	\$74.8	\$56.6	\$66.2	\$63.8	\$57.4
NASA -- Salary + Total R&T	\$58.5	\$60.8	\$58.7	\$61.7	\$60.7	\$54.1	\$53.1	\$53.1	\$30.5	\$0.0	\$0.0	\$0.0	\$0.0
(NASA Total includes Congressional Plus-Ups)													

DoD and NASA Dual Use Rotorcraft Investment



STATEMENT BY

**MG JAMES D. THURMAN
DIRECTOR, ARMY AVIATION TASK FORCE
OFFICE OF THE DEPUTY CHIEF OF STAFF, G-3
UNITED STATES ARMY**

BEFORE THE

**TACTICAL AIR AND LAND FORCES SUBCOMMITTEE
COMMITTEE ON ARMED SERVICES
UNITED STATES HOUSE OF REPRESENTATIVES**

ON

**AVIATION INDUSTRIAL BASE AND DEPARTMENT OF DEFENSE
ROTORCRAFT PROGRAMS**

SECOND SESSION, 108TH CONGRESS

MARCH 4, 2004

STATEMENT BY
MG JAMES D. THURMAN
DIRECTOR, ARMY AVIATION TASK FORCE
OFFICE OF THE DEPUTY CHIEF OF STAFF, G-3
UNITED STATES ARMY

Introduction

Chairman Weldon, Congressman Abercrombie, distinguished members of the committee, I appreciate the opportunity to appear and provide an update on Army Aviation in recent operations and how we intend to continue meeting current operational challenges as well as prepare for future ones.

We are witnessing historic times in our Army and our Aviation Force. As the recent Iraqi Freedom Operations Officer for the Combined Forces Land Component Commander (CFLCC), I can testify that our Army in general and specifically our Aviation leaders and soldiers are well-trained, reliable, and ready. I would like to begin by thanking the committee for your resolute support, concern, and faith in America's sons and daughters, serving our Army and our Nation. I believe you all would agree that while Aviation hardware and other systems can become vital "business" decisions, our most precious and irreplaceable assets are the great Americans operating and repairing them.

The Chief of Staff of the Army (CSA), GEN Schoomaker, appointed me to lead a select group of aviation professionals from across our Army in a top-to-bottom review of Army Aviation. The CSA's guidance was to make Army Aviation a capabilities-based maneuver arm optimized for the Joint fight with a

shortened logistics tail. The Aviation Task Force is still working through many of the details required to transform this force. I will present the state of our current aviation force and lessons learned from current operations. I will also provide an overview of some key initiatives the Army will implement to prepare the force for on-going responsibilities and to pace Aviation transformation relative to the rest of the Army while simultaneously increasing Aviation capabilities, instituting modularity, and providing flexibility.

Current Aviation Force and Lessons Learned

Army Aviation currently has 434 aircraft deployed in Bosnia (SFOR-13), Afghanistan (OEF-5) and Iraq (OIF-2). Deployed aircraft as a percentage of the tactical fleet: 15% AH-64 Apache, 29% OH-58D Kiowa Warrior, 15% UH-60 Black Hawk, 16% CH-47 Chinook, and 19% Fixed-Wing. In addition to these deployed aircraft the Army is currently expending \$1.6 billion (FY04) to Reset (clean, inspect, replace) and repair crash-battle damage of 1054 aircraft as well as aviation support equipment from previous rotations. Nearly 60% of the Army's tactical aircraft fleet are currently either in Reset or deployed.

Army aircraft and aircrews performed superbly at an unparalleled operational tempo (OPTEMPO) in one of the harshest, most unforgiving environments on the planet. This OPTEMPO and the impacts of desert-induced damage led us to fund approximately \$55M (FY04) in Desert Kit improvements including aircraft engine inlet barrier filters, ground power unit inlet barrier filters, OH-58D hydraulic filters, ALQ-144 filters, rotor blade protection and aircraft covers. All deploying aircraft will also receive these upgrades.

While deployed for the war in Iraq, I developed some impressions I would like to share with you. The bottom line on these impressions are we must be ready when called and there may not be time to train up before we go. Therefore, we need to have trained, standardized modular units that are fully connected to the combined arms team and joint forces.

Our aviation leaders and troopers performed admirably adjusting to ad-hoc task organizations. Today our aviation structure is designed to support five different active component divisional organizations (Air Assault, Airborne, Heavy Division, Light Division, Korea) and two different reserve component structures. Specific divisional structures led us to specific but different aviation organizations. For example we have 18-ship Apache battalions in Heavy Divisions, but 21-ship battalions at Corps and 24-ship battalions in the 101st Air Assault Division. 18-ship Apache battalions did not provide enough aircraft for continuous close support to maneuver commanders required in non-contiguous operations. Additionally, aviation forces were-lift deficient at almost every level. Our units were extremely taxed accomplishing intra-theater cargo and troop movement. Even though the U.S. Air Force provided intra-theater lift support, Reserve Component C-23 Sherpa's were activated to augment CH-47 Chinooks. Sherpa's however, are payload challenged in terms of performance and internal dimensions. More utility and cargo capacity was required to support the long division maneuver from Kuwait to Baghdad. Heavy Divisions consisted of only 16 UH-60 Black Hawks for general support. With limited intra-theater and Corps

assets already overloaded, there were minimal cargo assets to augment divisional supply requirements.

In the new aviation structure Apache battalions are all 24-ship organizations. Black Hawks are increased from 16 to 30 aircraft to provide every Division the capability to conduct (at least) a battalion-size air assault in one lift as well as increase overall aerial logistics capacity. Aerial cargo support was also moved closer to the warfight by shifting CH-47 Chinooks from Corps to the divisional aviation brigade. Additionally, a new fixed-wing Operational and Organizational (O&O) document is in staffing that proposes increasing tactical (TOE – Table of Organization and Equipment) aircraft, reducing administrative support (TDA -Table of Distribution and Allowances) aircraft and significantly increase intra-theater lift potential.

The future demands more standardized modular formations, standard operating procedures (SOPs) and joint training. Disparities in types, numbers, mission and SOPs for aircraft and their assigned units impede flexibility that is traditionally a hallmark capability of Army Aviation. Standard basic building blocks are the first step in creating modularity. Second, these standard units must utilize similar SOP's. The whole concept is standardized and modular units that can "plug and play" with other units. Finally we must train more aviation at Combat Training Centers (CTC) to further strengthen our combat arms capability. Every OIF commander I talked to said the CTC prepared them for this war. The Army's CTC program is vital to the future, however we must strive to include more jointness in our training activities.

Logistics will be our Achilles heel in the future if we do not get it right. The Army requires future force systems that have predictive, imbedded diagnostics and prognostics –like those in our new cars that tell you when an oil change or maintenance is necessary. Aviation maintenance must also transform to support standardized and modular concepts. The non-linear battlefield will require transitioning to two-level condition-based maintenance replacing defective parts on the system while deployed forward and repairing those parts off the system in rear areas or in the U.S. Condition-based maintenance also means repairing equipment only when it breaks or is predicted to break. This concept reduces spare parts requirements, maintenance equipment, forwardly stationed maintainers and ultimately the logistics footprint. However, modularity also implies that maintainers must also be proficient warriors. Everyone must soldier first and secure themselves no matter what type unit. The nature of warfare in the future demands this.

The Army must also improve on combat safety. For aviation, that includes improving the power margins required to fly at extreme altitudes similar to Afghanistan as well as avoid or operate in brown-out conditions that occur in desert environments like Kuwait and Iraq. There are materiel improvements that we intend to incorporate on our current aircraft like fly-by-wire systems that provide hands-off recovery and/or landing in obscuration and low visibility similar to today's civilian jet liners.

The distances covered in today's warfight will only grow in the future. Our operations require satellite-based communications that can span the maneuver

distances as well as terrain to effectively operate in a net-centric system-of-systems construct.

I'm further concerned about the synchronization and impact of bandwidth and frequency spectrum on what will eventually be a proliferation of Unmanned Aerial Vehicle Systems (UAVS) on the future battlefield. In Iraq, forces had a difficult time operating UAVS due to limitations in the bandwidth and limited frequency spectrum. The Army will take a holistic approach to the development and utilization of UAVS. In Spring 2004 the Army will deploy a UAVS Task Force to study methods and procedures for more effective integration of UAVS into the Army and Joint operations.

With continuing lessons learned in our ongoing combat operations, let me stress that the Army still has the best aviation forces in the world thanks to the dedication and hard work of outstanding commanders and soldiers who are accomplishing the mission, but we still owe them the very best equipment.

Army Aviation as a Capabilities-Based Maneuver Arm Optimized for the Joint Fight – Logistics Tail Shortened

The Aviation Task Force mission to transform Army Aviation into a capabilities-based maneuver arm optimized for the Joint fight with a shortened logistics tail requires a structure that is more modular and tailorable in order to support a range of missions and/or units. In addition to organizational and structure changes developed from lessons learned in current operations, Special Operations Aviation (SOA) capabilities were reviewed to determine what could migrate into the conventional aviation force. Examples of previous SOA

capabilities migrated into the regular force include night vision goggles, aviation life support equipment and crashworthy fuel tanks. The Aviation Task Force also studied active and reserve component responsiveness in order to optimize force readiness for deployability as well as limit reserve activations and enhance their stability. Finally, we looked at current and planned systems to determine their relevancy and synchronization in meeting Future Force requirements to include interoperability with the Future Combat Systems (FCS) and Joint tactical warfighting.

Army Aviation is a unique combat element whose requirements extend across all Joint Functional and Operating Concepts. The Task Force analyzed required capabilities from Joint doctrine down to company level in order to develop a basic building block for units. These company building blocks permit the creation of a truly capable Aviation Unit of Action (UA) with standardized formations. Aviation UAs are multi-functional aviation brigades that will support four to five brigade combat teams. The Aviation UA incorporates the lessons learned from recent operations and corrects deficiencies in our current structure by moving aviation assets closer to the warfighter.











Company Building Blocks

Capable & Lethal – More combat power in support of the soldier

Modular – Standard Company size capabilities

Tailorable – Flexible for Task Organization

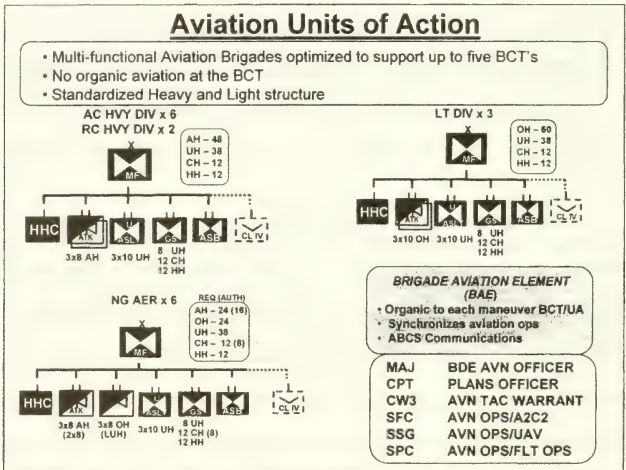
Sustainable – Provide Modular Maintenance Packages

  <p style="text-align: center;">8 10</p> <p><u>Missions:</u></p> <ul style="list-style-type: none"> • Close Combat Atk • Mobile Strike • Recon • Security <p><u>Capabilities:</u></p> <ul style="list-style-type: none"> • Scout & Attack • 2 Acft 12-Hr Opns for 72-Hrs • Destroy 1-Mounted BN 	  <p style="text-align: center;">10</p> <p><u>Missions:</u></p> <ul style="list-style-type: none"> • Assault • Lift <p><u>Capabilities:</u></p> <ul style="list-style-type: none"> • IN Co Asslt element (128) in 1-Lift (Seats out ACL of 16) 	  <p style="text-align: center;">8</p> <p><u>Missions:</u></p> <ul style="list-style-type: none"> • General Support • A2C2S • ASB <p><u>Capabilities:</u></p> <ul style="list-style-type: none"> • A2C2S for 4 UAs • 1Plt: GS (ASB) 	  <p style="text-align: center;">12</p> <p><u>Missions:</u></p> <ul style="list-style-type: none"> • Heavy Lift • General Support <p><u>Capabilities:</u></p> <ul style="list-style-type: none"> • FA BA in 1-Lift • 2 Acft 24-Hrs Opns for 72-hrs 	  <p style="text-align: center;">12</p> <p><u>Missions:</u></p> <ul style="list-style-type: none"> • MEDEVAC <p><u>Capabilities:</u></p> <ul style="list-style-type: none"> • 3 Acft Medical Spt for 4 UAs
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The Aviation UA is able to organize by task, purpose and mission. This provides several advantages over the current force structure. The organization now includes robust scout, attack, air assault, utility and cargo capabilities. It also includes organic aviation maintenance support in the aviation support battalion (located today at the division support command). Combat medical evacuation aircraft are directly organic to the aviation brigade commander to better support our forces. Further, it will be much easier to task-organize across divisions in order to meet the maneuver commander's air requirements.

The Aviation UA will contain the Class IVa Unmanned Aerial Vehicle Systems (UAVS) in the future that will enhance manned-unmanned teaming and add more reconnaissance and surveillance capabilities to the Brigade. We

learned from Special Operations Aviation (SOA) about their utilization of robust liaison teams habitually attached to their "customers." In turn, we developed a Brigade Aviation Element (BAE) organic to every ground maneuver unit equipped with long-range joint communications packages to better synchronize and deconflict airspace for responsive planning and execution of combat operations. Additionally, starting this year the Army will field an interim standardized logistics automation system migrated from SOA to fill an automation void and improve aviation maintenance.



Army Aviation Modernization

Last week the Army leadership announced initial results of the Aviation Task Force. A significant recommendation was to reallocate RAH-66 Comanche funds to improve the overall capabilities and health of the aviation force. Terminating Comanche was not an easy decision or one made without considerable analysis by my Task Force and the Army leadership. However, Comanche had become 40% of the current aviation budget and up to 47% in the Extended Planning Period (EPP). By reallocating approximately \$14.6 billion (FY04-11) that would have bought the initial 121 Comanche's the Army is able to restructure and revitalize Army Aviation to meet current and future requirements.

Ending Comanche reflects the Army's recognition of new and changing global security challenges and national security requirements. The net result of this reallocation will be a new buy of almost 800 aircraft to build modular tailorable forces and provide our Reserve Components with more modern systems. The Army will accelerate modernization to include Aircraft Survivability Equipment (ASE) for all airframes. This includes modernization of 1400 aircraft to increase capabilities, survivability and maintainability beyond 2020. The Army will buy at least 303 light utility helicopters in order to complete divestment of 880 UH-1 Hueys and OH-58A/C Kiowas. These FAA certified light utility aircraft will provide administrative support at our training bases and also be assigned to National Guard units to conduct state missions, assist in counter-narcotics operations, and respond to homeland security requirements. At least \$300

million will be added to our burgeoning UAVS programs to accelerate their fieldings.

The net result of reallocating aviation resources includes procurement, recapitalization, and modernization of 70 percent of the rotary wing fleet plus enhanced Aircraft Survivability Equipment (ASE). In conjunction with our sister services we will begin development of joint vertical lift platforms that provide commonality and revolutionary capabilities in the future. In the meantime, Army aviation will take a huge step towards the future with balanced and integrated capabilities, modular and tailorable formations, cohesive and highly lethal units that are deployable, versatile and able to operate in a Joint warfight. Overall, this reinvestment should provide no net loss of business and revenue in the rotorcraft industry.

As the Army modernizes the fleet, priority of fielding new, recapitalized or remanufactured aircraft is based upon operational unit rotations and support to the Global War on Terrorism (GWOT). Following current operations and GWOT, units with shortfalls are the next priority. The Army's policy is to provide deploying units (independent of component) with the newest and best available equipment.

Aviation Survivability Equipment (ASE)

The Army equips the AH-64, UH-60, CH-47, OH-58D, and fixed-wing Special Electronic Mission Aircraft (SEMA) with A-kits to accept ASE consisting of detectors, Infrared Red (IR) and Radio Frequency (RF) jamming devices, and

chaff and flare munitions to counter RF and IR threat systems. All Active Army, National Guard, and Army Reserve deployed aircraft, are equipped with ASE. Additionally, protection against direct fire from small arms weapons is provided by armor panels, most frequently located in crew compartments and sensitive areas of the aircraft (such as the engine). On January 9, 2004, an Army G3 Policy Board approved the acquisition of Aircraft Ballistic Protection Sets (APBS) for deployed Cargo and Utility Helicopters that will ensure an enhanced degree of protection throughout the cargo/passenger compartment.

Currently, the Army is modifying OIF utility fixed-wing fleet to accept ASE while upgrading in theater and deployable CH-47's with the ALE-47 Flare/Chaff Dispenser to counter anticipated anti-aircraft threat missile systems. On 14 January 2004, the Chief of Staff approved an accelerated ASE acquisition plan that will initially focus on upgrading to the next generation Common Missile Warning System (CMWS) and Improved Countermeasure Munitions Dispenser (ICMD) for OIF / OEF deployed and deploying helicopters and fixed wing aircraft. This effort will commence by upgrading CH-47's, followed by selected fixed wing aircraft, UH-60's, and AH-64's. Over the Program Objective Memorandum (POM) period, the Army's modernized aviation fleet will be modified to accept an advanced countermeasure system consisting of CMWS / ICMD and a Multi-Band LASER Jammer.

As a result of ongoing combat operations, the Army formed an assessment team to review in-theater missile / helicopter incidents. The goal of this team is to develop lessons learned for incorporation into Standard Aviation

Programs of Instructions and Tactics, Techniques, and Procedures (TTP's) adhered to by Army Aviation Units.

Aviation Science and Technology (S&T)

The Army Aviation Science and Technology (S&T) program produces new knowledge to fuel revolutionary aviation development, expands scientific knowledge in the area of manned and unmanned helicopters, and matures and demonstrates these technologies in support of the Future Force and Joint Vision 2020. Based on the Army Transformation, this effort has been focused to investigate and develop technologies applicable to unmanned systems and to support selected opportunities for manned systems. The Vertical Takeoff and Landing (VTOL) Unmanned Aerial Vehicle Systems (UAVS) potentially brings unprecedented agility, maneuverability, and lethality to the Future Force, while reducing signatures and logistics burdens. The Transformational nature of the UAVS, both in capabilities and new paradigms, has energized the aviation field (in industry and academia) to truly "think outside the box." The benefit to the Department of Defense (DoD) and the Army will be revolutionary warfighting capabilities, as well as enhancements to the current force.

The Army has a unique responsibility within DoD as the service lead for rotorcraft S&T investment. Under DoD Project Reliance, the Army has the responsibility to address the rotorcraft S&T requirements of all services and the Special Operations Command (SOCOM) in areas that are not service or command unique.

The aviation S&T program invests in three areas: basic research; applied research; and advanced technology development. The Army invests in world-class expertise in academia, industry and other government agencies, as well as in state-of-the-art equipment in the area of basic research. A highlight of basic research is investment in the Rotorcraft Centers of Excellence at Pennsylvania State University, Georgia Institute of Technology and the University of Maryland. Basic research is conducted by the Aviation and Missile Research, Development and Engineering Command (AMRDEC) Aeroflightdynamics Directorate (AFDD) located at the Ames Research Center, Moffett Field, CA and by the Army Research Laboratory (ARL) Vehicle Technology Directorate at the Glenn Research Center, Cleveland, OH and the Langley Research Center, Langley Air Force Base, VA.

The Army Aviation applied research program provides the enabling technology and baseline for aviation development. This research includes enabling technologies for manned and unmanned rotorcraft in propulsion, rotors, drive train, and structures. A highlight of the program is the expansion of knowledge in air system autonomy and manned-unmanned teaming. The applied research program also invests in the National Rotorcraft Technology Center. The Center is a partnership of government, industry, and academia for developing air vehicle designs and other rotorcraft technologies. The program is executed at AFDD at the Ames Research Center and the Langley Research Center and the ARL Vehicle Technology Directorate at the Glenn Research Center and the Langley Research Center.

A key element of the aviation applied research program is the longstanding partnership the Army has established with the National Aeronautics and Space Administration (NASA). This partnership, first established in 1965, has resulted in an exemplary, highly integrated national technology program that is devoid of duplication of facilities and programs, as well as being fully coordinated with industry. The Army and DoD leverages NASA intellectual capital in rotorcraft and world class facilities; all fielded United States military rotorcraft, and derivations that have established our commercial base, can be traced back to this Army/NASA partnership. DoD/Army rotorcraft and VTOL UAVS technology development strategy depends on the continuing partnership with robust, closely related NASA technology programs.

The aviation advanced technology development program is focused on UAVS, with an emphasis on demonstrations to provide the warfighter with the menu of technology for development and integration into the force. The demonstration programs will mature technology into realistic and robust prototypes. Technologies that enable autonomous flight, higher aerodynamic airframe loads, and increased maneuverability possible with UAVS will be demonstrated. A highlight of this effort is the Airborne Manned-Unmanned System Technology (AMUST) and the Hunter-Standoff Killer Team (HSKT) Advanced Concept Technology Demonstration (ACTD). These programs constitute the major effort to demonstrate manned-unmanned teaming. The program also invests in propulsion, drive train and structure technologies that enable UAVS application and have technology transfer opportunities to manned

airframes. The advanced technology development program is managed by the AMRDEC Aviation Applied technology Directorate (AATD) at Fort Eustis, VA.

Another notable highlight of the advanced technology development program are the Army-Defense Advanced Research Projects Agency (DARPA) partnering on UAVS platforms for lethality, surveillance and communications relay. The Army is pursuing increased lethality for the Future Force through the Unmanned Combat Armed Rotorcraft (UCAR) program (an armed VTOL UAVS) designed to team with manned or unmanned systems. Increased surveillance capability is being pursued through the A-160 Hummingbird Program, a medium altitude, long endurance VTOL sensor and communications platform, and the Organic Air Vehicle (OAV), a ducted fan VTOL UAVS that can be carried by the soldier and/or launched from a vehicle.

The investment by the Army in aviation S&T is guided by the requirements of the Future Force. Our investment in advanced technology development will grow in the coming years to meet the challenges of those requirements. The Army is confident that the aviation S&T investment represents a prudent program that meets the DoD and Army Transformational goals.

Conclusion

In closing, I have been very impressed and pleased with the performance of Army Aviation in our recent and ongoing operations. But we can get better.... We have to get better. Strengthening Army Aviation and investing for a successful future reaffirms the Army's commitment to our soldiers, our sister

services and the nation, that only the best equipment and capabilities put into the hands of the finest soldiers in the world will be brought to bear in protecting our way of life, defeating terrorism and the fight for freedom over tyranny.

Thank you for allowing me to share our work and participate in this session. I am prepared to answer your questions.

Reconnaissance (OH-58A/C/D, TH-67) Inventory

Theater	KW	Corps	AC KW	RC KW	Other	AC KW	RC KW	AC TH	AC 58	RC 58
NEA		I Avn Bde			AMC				9	58
SWA		54 Bde			MOB					291
USAREUR		4278 RAS		18	BGF					
USARSO		II Avn Bde			USAAVNC	36		169	136	
USARAK		III Spt Bde			USAAALS	9				
		43 RAS		21	WAA TS					
		V Avn Bde			EAATS					
		V Spt Bde			HATS					
		XVIII Avn Bde			21 CAV					
		XVIII Spt Bde			NTC				8	
		47 RAS		24	JRTC				8	
					CMTC					
AC Division		RC Division			Test	4				
1 AD	16	28 ID			PM				5	
1 CAV	16	29 ID(L)			SEP	14				
1 ID	15	34 ID			CRF					
2 ID	16	35 ID			Crash Dam	14				
3 ID	15	36 ID								
4 ID	16	40 AD								
10 ID(L)	31	42 AD								
25 ID(L)	38	49 AD								
82 Abn	46									
101 AA	23									

	OH-58 AC	KW	TH-67
AC	RC	AC	RC
MTOE Sub		277	18
Other sub	167	291	169
Subtotal	OH-458	KW-372	TH-
Grand Total			1371

Average Age: D mod 12 yrs A/C Mod 33 yrs. TH Mod 5 yrs

AS OF 18 Nov 03

Assault (UH-60) Inventory

Theater	AC	ARNG	Corps	AC	ARNG	USAR	Other	AC	ARNG	USAR
NEA	31	31	I Avn Bde		78	78	MED TDA	25	11	
SWA		24	24	4 278 RAS		8	8	USAAVNC	90	88
USAREUR	8	8	III Avn Bde	8	62	62	8	USAAALS	23	23
USARSO	10	10	43 RAS	8	13			MFO	8	0
USARAK	10	10	V Avn Bde	46	46	32	32	EAATS		11
			XVIII Avn Bde	16	16	54	54	8	8	
SOF*	60	60	4-2 RAS	8	8			21 CAV	2	0
								NTC	10	10
MEDEVAC*	163	195	144	144				JRTC	5	5
								TRADOC TDA	9	9
								USAREUR TDA	3	3
								USARJ TDA	5	5
								CMTC	6	6
AC Division			RC Division					Test Centers	22	22
1 AD	16	15	28 ID		16	16		MDW	18	17
1 CAV	16	16	29 ID(L)		16	16		USMA	2	0
1 ID	16	16	34 ID		15	16		RECAP	79	21
2 ID	30	30	35 ID		84	43		ORF	0	0
3 ID*	16	16	38 ID		86	43		Attention	15	8
4 ID	16	16	40 AD		16	16				
10 ID(L)*	30	28	42 AD		16	16				
25 ID(L)	30	30	49 AD		16	16				
82 Abn	30	29						MTOE Sub	644	713
101 AA*	76	112	8	8				Other sub	333	237
								Total	977	850
								Grand Total	1680	1569

☐ UH-60s on hand

* AC aircraft on hand as of Nov 03; est. RC aircraft on hand as of end FY04

Average Age: A Mod 18 yrs / L Mod 7 yrs

AS OF 18 Nov 03

AS OF: 18 Nov 03

Utility (UH-1) Inventory

AS OF 18 Nov 03

Fixed Wing Inventory

Theater				Corps				Other			
AC	ARNG	USAR		AC	ARNG	USAR		AC	ARNG	USAR	
NEA		8	16	I - Avn Bde				PAX Rgr	4		
SWA		8	24	I - Spt Bde				MEDCOM	2		
USAREUR	16	16		4:278 RAS				AMC	12		
1st MI	8			II Avn Bde				ATC	1		
3rd MI	12			II Spt Bde				F-44ATS		8	
224th MI	10			4:3 RAS				INSCOM	9		
15th MI	12			V Avn Bde				CECOM	3		
204th MI	9			V Spt Bde				ATTC	7		
				XVIII Avn Bde				TRADOC	13		
				XVIII Spt Bde				OSA		80	
				4:2 RAS				U Mod	2	2	
AC Division				RC Division				USAREC	5		
1 AD				28 ID				USASOC	2		
1 CAV				29 ID(L)				West Point	2		
1 ID				34 ID				PM ACS	1		
2 ID				35 ID							
3 ID				36 ID							
4 ID				40 AD							
10 ID(L)				42 AD				MTCE Sub	74	32	40
20 ID(L)				49 AD				Other -sub	63	90	
B2 Abn								Sub Total	137	122	40
101 AA								Grand Total			-209

Average Age varies among the different FW types from 20 yrs for C-12 to 6 yrs for UC-35

AS OF 18 Nov 03



Testimony of Joseph H. Bogosian
Deputy Assistant Secretary of Commerce for Transportation and Machinery

“The Aviation Industrial Base and Department of Defense Rotorcraft Programs”
Subcommittee on Tactical Air Land Forces,
Committee on Armed Services, U.S. House of Representatives

March 4, 2004

The Role of the Department of Commerce

Good morning Mr. Chairman, Mr. Ranking Member and Distinguished Members of the Subcommittee. Thank you for the opportunity to share the views of the U.S. Department of Commerce on the aviation industrial base. I am Joe Bogosian, and I serve as a Deputy Assistant Secretary within the Department’s International Trade Administration (ITA). In this capacity, I manage the Office of Aerospace, as well as the Office of Automotive Affairs and the Office of Machinery. These industry offices focus on competitiveness issues for their respective industries, including trade policy activities.

In cooperation with other agencies and offices, including the U.S. Trade Representative and the State Department, my office seeks to ensure open and fair competition in world markets for U.S. civil aerospace products. Working with the Department of Transportation and the Federal Aviation Administration, we monitor foreign regulations and specifications to ensure that they do not prejudice imports of U.S. aerospace products. With the assistance of our U.S. Export Assistance Centers and our overseas Foreign Commercial Service Officers, our office undertakes trade promotion activities through the organization of trade missions, conferences and participation at air shows worldwide.

At the Department, we also advocate on behalf of the sale of U.S. military goods through the Bureau of Industry and Security (BIS) and on behalf of commercial goods through the Advocacy Center. These offices have helped U.S. companies win billions of dollars of awards in overseas procurement competitions by effectively marshaling the full resources of the U.S. Government in their support. We also host the Trade Promotion Coordinating Committee, which helps to coordinate interagency cooperation and consistency on a host of issues. The BIS also regulates dual-use export controls on the Commerce Control List in parallel with the State Department’s administration of the U.S. Munitions List.

Mr. Chairman, as you are aware, over the past five years, about 80 percent of U.S. helicopter production served military needs. (Of the total helicopter revenue of \$7.1 billion from 1998-2002, 81.3 percent was military.) As such, the government’s portfolio for the helicopter industry has resided primarily at the Department of Defense, NASA and the FAA, while the Commerce Department has helped the industry with specific export control, procurement advocacy and general competitiveness issues. I was asked to provide a high-altitude context for this hearing by discussing some of the larger issues confronting all U.S. manufacturers, some aerospace-specific global competitiveness

issues, and then allow my fellow panelists from industry and other federal agencies to delve into their portfolios of the helicopter industry.

The Manufacturing Initiative

Starting from a high altitude but a very important area, I would like to review some critical factors regarding the U.S. manufacturing sector. U.S. manufacturing is generally experiencing a strong rebound from the recent economic downturn, which hit the sector particularly hard. From the peak of manufacturing production in June 2000 through January 2004, the number of manufacturing jobs in America dropped from 17.3 million to 14.3 million, a 17 percent decline. U.S. manufacturing was further struck by the stock market decline due to the bursting of the technology bubble, and the corporate accounting scandals. Aerospace manufacturing was additionally hit by the SARS epidemic which drove down tourism, the airline industry and the entire supply chain of aerospace manufacturers, as well as by the tragedy of September 11th and the ensuing war on terrorism.

The President acted to strengthen job creation in America and his policies are working. The U.S. economy grew at an 8.2 percent clip in the third quarter of 2003 – the strongest growth in 20 years – and continued at an over 4 percent growth rate in the most recent quarter while the unemployment rate was beaten back to 5.6 percent -- below the average of each of the decades of the 1970s, 1980s, and 1990s. Over the past five months, 366,000 new jobs were created – with 112,000 of those in January 2004 – and more manufacturers are reporting increases in production than at any time in the past 20 years. Our manufacturers still need us, and there is still more to do.

In March of 2003, Secretary Evans announced a Manufacturing Initiative to develop a strategy designed to ensure that the Government does all it can to create the conditions necessary to maximize U.S. competitiveness in manufacturing. To maximize our understanding of the issues and garner industry recommendations, the Commerce Department convened over 20 public roundtable events nationwide with manufacturers from the aerospace, automotive, semiconductor, chemical, plastics, and machinery sectors, among others. The manufacturers attending these roundtables represented a broad mix of small, medium-sized, and large companies, as well as minority-owned and women-owned enterprises.

Regardless of their individual sector, manufacturers identified common problems challenging their competitiveness. They asked for government to eliminate the indirect costs imposed on them due to high health care costs, litigation costs, energy costs and regulatory costs. They asked that tax policies promote competitiveness and innovation. They identified the need to address education, workforce and training challenges. And they asserted that U.S. manufacturers can compete with anyone in the world, so long as they are competing by the same rules.

Our collective findings and recommendations are contained in an 88-page report released in January by the Commerce Department entitled, "Manufacturing in America: A

Comprehensive Strategy to Address the Challenges to U.S. Manufacturers.” The report spells out an entire range of recommendations that federal agencies and Congress should consider and pursue to improve the competitiveness and health of U.S. manufacturers. These recommendations include and build on the six specific steps that President Bush has identified as priorities: making health care costs more affordable and predictable, reducing the burden of lawsuits on our economy, ensuring an affordable, reliable energy supply, streamlining regulations and paperwork requirements, opening new markets for American products, and enabling families and businesses to plan for the future with confidence by making tax reductions permanent.

One of these recommendations calls for the creation of an Assistant Secretary of Commerce for Manufacturing and Services within ITA -- to whom I will directly report -- to develop, advocate, and help implement policies that will improve U.S. manufacturers’ competitiveness. Our new Manufacturing and Services Division will focus on domestic issues, as well as foreign market obstacles, that impair U.S. manufacturing and industry competitiveness. As government advocates for the manufacturing sector, we will work concertedly within the policy-making process to address the needs of U.S. manufacturers.

The Commerce Department is also working on other recommendations in the report, including negotiating the elimination of trade-distorting subsidies, promoting global use of U.S. technical standards, reviewing dual-use export controls, and developing a new Office of Investigations and Compliance and an Unfair Trade Practices Task Force to help enforce trade agreements and combat unfair trade practices.

Our manufacturing report also calls for permanent income tax cuts, permanent research and experimentation tax credits, and a reduction in tax complexity. It recommends a review of burdensome regulations, the promotion of health care reforms, tort reform, a stronger U.S. patent system, an appropriate focus on federal research and development programs to advance innovation and productivity-enhancing technologies, the establishment of cooperative research programs between universities and small businesses, and a review of the existing vocational-technical education system to determine if it meets the needs of the manufacturing sector. It also calls for greater assistance for manufacturing-dependent communities in transition and programs to enable workers to develop the skills necessary for employment transition to emerging and growing industries.

Overview of the Aerospace Industry

Actions at the federal, state and local levels of government in response to these recommendations will directly help the aerospace industry as much as any other sector.

As we all know, aerospace is one of America’s leading industries, generating high technology capabilities and conveniences, and hundreds of thousands of high-paying jobs. The continued growth of high-paying jobs, an efficient transportation system, the economic well-being of our nation, and indeed our national security are dependent on a healthy and robust U.S. aerospace industry.

The aerospace industry sector is also America's largest net exporter of manufactured goods, helping to redress our trade imbalance more than any other industry sector. Of the total output in 2003 of an estimated \$122 billion, about \$51 billion, or approximately 41 percent, was exported. In 2003, the industry recorded a trade surplus of about \$27 billion.

Aerospace is comprised of many sub-sectors, including large civil aircraft, general aviation (including small private planes, business aviation, and commuter aircraft), rotorcraft, military aircraft, spacecraft, launch vehicles, missiles, aircraft engines, aircraft maintenance equipment, air traffic management systems, and airport equipment. In 2003, military aircraft production led all other sectors accounting for 26.9 percent of total aerospace industry revenue, the space sub-sector stood at 23.9 percent, civil aircraft at 22.9 percent, related civil products added another 17.6 percent, and missiles at 8.8 percent (with rounding errors). It is important to note that roughly 72 percent of total U.S. aerospace industry output is procured by federal, local, and foreign government entities.

The economic and security climate of the last few years have impacted the sub-sectors in various ways. U.S. military aircraft, which includes helicopters and missiles, have benefited from increased defense spending in the United States, while orders for commercial aircraft, general aviation, civil helicopters, spacecraft, and launch vehicles, have decreased.

The performance of the commercial aircraft sub-sector, which dominates the civil aerospace sector with its high unit costs, has led to overall revenue growth stagnation for the U.S. aerospace industry over the past few years. Declining tourism and travel by the business community threw international airlines into financial distress, with a number of top U.S. carriers flirting with bankruptcy. The decline of the market for new large civil aircraft, coupled with the ascendancy of Airbus via aggressive pricing and the financial support of European governments, have compounded Boeing's continuing decline in aircraft deliveries.

The United States is no longer the world's predominant supplier of large civil aircraft, having lost that mantle last year when Airbus delivered more aircraft than Boeing after three consecutive years of winning the majority of new aircraft orders. Our current status in the large civil aircraft business is a far cry from the days when we had two and three U.S. manufacturers fully supplying Western markets.

In 1988, during the final spike in Cold War spending, U.S. military aircraft accounted for 69 percent of total U.S. aircraft sales (by revenue) despite the predominant position of U.S. civil aircraft manufacturers in global markets. By 1999, at the height of the economic boom, the pendulum swung to U.S. civil aircraft sales, which then accounted for 60 percent of total revenues. Currently, according to Aerospace Industries Association (AIA) estimates, the two sectors have reversed prominence again, with the

military aircraft sector recording an estimated \$40 billion in sales, compared to the \$34 billion logged by civil aircraft sales in 2003.

From 1990 to 2003, the number of workers producing all aircraft and aircraft parts fell from 672,000 to 369,000, a decline of 45 percent. If we exclude the massive restructuring of the industry that followed the conclusion of the Cold War, and concentrate only on the last five years (from 1998 through 2003), employment still declined by 25 percent – contributing sharply to the 17.6 percent total loss of manufacturing jobs over that same period that I referenced earlier.

While the United States has been dislodged for the time being as the top supplier of large civil aircraft, the U.S. aerospace industry is still the best in the world by virtue of its leading positions in the supply of military aircraft, general aviation aircraft, spacecraft, and missiles. While, according to AIA estimates, general aviation sales and space launches remained in decline during 2003, U.S. civil helicopters rebounded from only 318 units delivered in 2002, to 507 deliveries in 2003. Revenue more than doubled from \$157 million to \$348 million. Constant vigilance and active policies are needed to build upon any good news.

Aerospace Industry Trends and Strategies

In the rotorcraft industry, the French-German Eurocopter and the Italian-British firm Agusta Westland are the world's first and third-largest producers, respectively, competing largely against U.S. manufacturers Bell, Sikorsky, and Boeing. To an interesting degree, the successful market strategy of Airbus is similar to Eurocopter, and we can draw important lessons by reviewing both sub-sectors in the same historical context.

As the U.S. defense industry consolidated in the early 1990s in response to reduced market demand following the end of the Cold War, many aerospace companies diversified into both the civilian and military sub-sectors to help offset cyclical markets. These companies also recognized that certain manufacturing processes and basic product technologies can benefit both the military and commercial sectors. Increasingly, we are seeing military procurements satisfied by variants of products previously developed for the civilian market.

In reaction to U.S. industry consolidation and similar market conditions, European aerospace and defense companies merged in the latter 1990s, culminating in the creation of the European Aeronautical Defense and Space Company (EADS), which is Europe's largest aerospace conglomerate. EADS essentially mirrored Boeing's strategy by incorporating military assets, including partnerships in the Eurofighter and Dassault Rafale fighter aircraft, to counterbalance its 80 percent shareholding in Airbus.

EADS also wholly owns Eurocopter, which, according to the company, captured 45 percent of the 673 new civil and military helicopters ordered by the global market in 2003. This market share contrasts sharply with Bell, Sikorsky, and Boeing, which

captured only 14 percent, ten percent, and three percent, respectively. Eurocopter also claims to hold a 48 percent share of the U.S. civil helicopter market, which includes civil defense procurements.

In 2001, the newly formed conglomerate, EADS, depended on Airbus for nearly 88 percent of its earnings (before interest and taxes, EBIT). With great success already achieved in the large civil aircraft and civil helicopter sectors, their unfortunate consequence is the increasingly flat growth curve of market shares in those modestly growing sectors. EADS understands that substantial upside potential and future corporate growth will depend on larger defense markets for its diversified military offerings.

For market growth and revenue stability, EADS apparently believes it must look beyond Europe's relatively small defense market and penetrate the crucial U.S. defense market. It wants to emulate the success of the UK's BAE Systems, its primary competitor in European defense markets (and 20 percent shareholder in Airbus). As you are aware, BAE Systems, through investment and acquisition, has become a leading prime contractor for the Pentagon.

While pursuing the lucrative U.S. defense market, Europe continues to follow a parallel, equally critical strategy: support and increase the competitiveness of its civil aerospace sector. Both the military and civil strategies are described in Europe's Vision 2020 report, the STAR-21 report, and their Sixth Framework research program.

Airlines and industry analysts tell us that competing models of Airbus and Boeing aircraft offer similar performance and operating costs, and that any variation can be factored into the initial cost of acquisition, which essentially drives the final purchasing decision. Airbus claims it can price lower than Boeing because it is more cost efficient. The United States maintains that fungible European government subsidies provided for the development of new aircraft models, over and above their indirect supports, permit Airbus to discount prices and win market share from Boeing. This is a similar pattern to the UK's subsidies to Rolls Royce aircraft engines that distort the market and take away market share from U.S. engine manufacturers, Pratt & Whitney and GE.

European governments justify nearly \$4 billion of launch aid for the new super jumbo A380 aircraft by alleging comparable levels of indirect U.S. Government support to Boeing through NASA and Defense Department research and development contracts. The U.S. Government notes that most defense research is mission-specific and does not benefit civil aircraft programs to a substantial degree, and further notes that comparable levels of research support is provided to Airbus parent companies EADS and BAE Systems. The U.S. Government does not provide launch aid to Boeing.

A number of other factors are also likely to be important determinants in the future direction of the U.S. aerospace industry. In the civilian sector, future demand by passengers and shippers for air transportation services will be key. Historically, the single most predictable gauge of this demand has been fluctuations in Gross Domestic Product (GDP). While we are a long way from achieving the level of record jet liner

deliveries experienced in the late 1990's, continued GDP growth in the United States and other countries, most notably Asian markets like China, bode well at least in the short term for this important aerospace sector. Unfortunately, demand for airline service and the aircraft to meet that demand remains vulnerable to episodic shocks like the 9/11 terrorist attacks and the SARS epidemic that resulted recently in such devastating effects on aerospace manufacturers.

In the military sector, U.S. Defense Department expenditures will continue to dominate future U.S. aerospace industry trends. The modest defense budgets of U.S. trading partners play a secondary role. Given the charter of your subcommittee, Mr. Chairman, and the witnesses here today from the Defense Department, there is little that I could add on this topic.

In both the civilian and military sectors, a significant factor on the future growth of U.S. aerospace manufacturers will be the extent to which their competitors from abroad are able to capture market share, here at home as well as in markets overseas. The most important competition to the United States comes from Europe. A host of factors bear on the competitiveness of U.S. aerospace manufacturers in the global market place. These include economies of scale, private as well as public investment in aeronautical R&D, differences in export control regulations between the United States and our trading partners, tax issues, subsidy national preferences, and international political relationships.

The Commission of the Future of the U.S. Aerospace Industry

Many of these issues were identified and addressed by the *Commission on the Future of the United States Aerospace Industry*, which published its full report in November 2002. I am proud of the contribution my staff at the Commerce Department made in preparing that report, especially in connection with the material on "Global Markets."

The Commerce Department played a leading role in helping to shape the Administration's response to the Commission's recommendations. Shortly after the report was issued, we led an interagency effort aimed at sharpening a public-private focus on the needs of the U.S. aerospace industry. Today, with the exception of the international trade portion of the Commission's report (in which we play a leading role), we are supporting other agencies that have the lead on the various issues addressed by the Commission.

For example, in the area of modernizing the U.S. air traffic management (ATM) system, a number of offices in the Commerce Department are contributing economic and analytical expertise to the Federal Aviation Administration. Our work will help to increase understanding of the economics that underpin the aviation industry and how changes in the current ATM system can produce benefits for the business community, not only in the aviation industry but in other industries as well.

In the area of workforce development, my staff is working with the Department of Labor and an industry committee with the aim of addressing the Commission's

recommendations in this area. In the area of export licensing, we are working with the Commerce Department's BIS and the Departments of Defense and State to help ensure an appropriate balance between the safeguarding of U.S. defense technology and the business needs of U.S. exporters. In the area of aeronautical research and development, my staff is assisting an interagency group that has begun a review of federally funded research and development with a view toward facilitating its dissemination to the private sector.

Mr. Chairman, you chaired a hearing on March 12, 2003, regarding the U.S. rotorcraft industrial base. At that hearing, Mr. Flater commented on the applicability of the Commission's recommendations to the helicopter industry. As you know, the recommendations impacting the helicopter industry focused on the portfolios of NASA, the Department of Defense, the State Department and the FAA.

The area of the Commission's report in which the Commerce Department is most involved concerns global markets and the need for free and fair trade in aerospace products. To an extent not seen in many industries, governments are a significant factor in the aerospace marketplace. Governments play two crucial roles: first, as customer, either of defense products or of civil aircraft (given governmental ownership or control of many non-U.S. airlines); and second, as a stakeholder in the economic well-being of their domestic aerospace manufacturers.

For many governments, including those of Europe, aerospace manufacturing is a strategic industry. The governments of the competitors of U.S. aerospace manufacturers intervene in the marketplace in various ways to support their domestic producers. As I mentioned earlier, this intervention can involve subsidies to produce new products, the creation of technical standards that favor domestic products, the offering of incentives to aircraft purchasers to boost the sale of domestic products, and tax and export financing programs that assist domestic producers in reaching markets abroad. Given this active role of other governments, the U.S. government is challenged to ensure that U.S. producers remain as competitive as possible in the global arena. Similarly, U.S. industry is challenged to work closely with the U.S. government to help address issues that arise. At the Commerce Department, one of our key responsibilities to meet this challenge is monitoring foreign government policies and pursuing appropriate action to promote a strong U.S. aerospace industry.

Concluding Remarks

In conclusion, Mr. Chairman, we know that there are many challenges confronting the U.S. manufacturing industry. Our Manufacturing Initiative report provides a comprehensive survey of policy recommendations that will benefit all U.S. manufacturers including the helicopter industry. We are working concertedly on the range of issues to support U.S. manufacturing and create jobs.

I would again like to thank you, Mr. Chairman, and all the Committee Members for this opportunity to express our views. I will be happy to take your questions.

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BY THE COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES

STATEMENT OF

Mr. Thomas E. Laux

Program Executive Officer

Air ASW, Assault & Special Mission Programs

And

REAR ADMIRAL Anthony L. Winns, UNITED STATES NAVY

Deputy Director of Air Warfare (N-78B)

And

BRIGADIER GENERAL Samuel T. Helland, UNITED STATES MARINE CORPS

Assistant Deputy Commandant for Aviation

Headquarters, U.S. Marine Corps

BEFORE THE

SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

OF THE

HOUSE ARMED SERVICES COMMITTEE

ON THE

DEPARTMENT OF THE NAVY ROTORCRAFT PROGRAMS AND FUTURE TECHNOLOGY

INITIATIVES AND CONCERNS

MARCH 04, 2004

NOT FOR PUBLICATION UNTIL RELEASED
BY THE COMMITTEE ON ARMED SERVICES

HOUSE OF REPRESENTATIVES

Mr. Chairman and distinguished members of the Subcommittee on Tactical Air and Land Forces, I am Mr. Thomas Laux, Program Executive Officer for Air Anti-Submarine Warfare, Assault, and Special Mission Programs. In representing our Navy/Marine Corps team, I am today joined by Rear Admiral Anthony L. Winns, the Deputy Director of Air Warfare, and Brigadier General Samuel T. Helland, Assistant Deputy Commandant for Aviation, HQMC. We are pleased to appear before you to provide an update on the Department of the Navy rotorcraft programs and future technology initiatives and concerns. I, and my Navy and Marine Corps colleagues in the rotorcraft community, sincerely appreciate your interest in our rotorcraft program capabilities and initiatives.

As you are keenly aware, rotorcraft are essential to Navy/Marine Corps deployed forces as evidenced by Operations Iraqi Freedom and Enduring Freedom. In support of joint and coalition operations, maritime forces provided Sea Strike and Sea Shield capabilities of unprecedented range and accuracy, global connectivity of great capacity and survivability, and streamlined logistics to support joint forces throughout the battle space. To meet the Sea Shield requirements, dominance in

the missions of Anti-Submarine Warfare, Anti-Surface Warfare, Mine Interdiction Warfare, and Naval Special Warfare are essential.

The versatility of Naval rotorcraft has proven itself to be a vital asset to the Naval battle group. With more rotorcraft in the battle group than ever before, mission tasking is on the increase, and transformation of the rotorcraft Concept of Operations is key to future operations.

Since Chief of Naval Operations approval of the Naval Helicopter Concept of Operations in January 2002, the rotary wing transformational initiative took a major step forward and continues to mature. Simultaneously, the Marine Aviation Campaign Plan established a vision for Marine Corps rotorcraft operations in the future. Because of the diverse applications and distinctly different battle group missions, the Navy and Marine Corps offer unique solutions to meet specific needs. However, rotorcraft are the common thread required to realize the offensive capabilities of the Carrier Strike Group, Expeditionary Strike Group, and Surface Action Group.

As these rotorcraft Concepts of Operations continue to develop, our challenge is to provide the highest value and responsiveness in answering Warfighter requirements for effective, reliable, interoperable, and affordable weapons systems. The Navy Helicopter Concept of Operations and the

Marine Aviation Campaign Plan are the linchpins of a modern, total force solution to increase Fleet capability and lethality in the littorals.

The Navy Helicopter Concept of Operations outlines the neck-down of the Navy's battle group helicopter force from seven type/model/series to three, the new MH-60 Sierra and MH-60 Romeo, alongside the legacy MH-53E with the overall objective of greatly expanding war fighting capability while significantly reducing costs. This plan capitalizes on efficiencies of singular maintenance, logistics, and training pipelines, while satisfying the needs of both active and reserve forces. The Concept of Operations will change the helicopter force structure and command structure in order to get the maximum war fighting capability of these two new helicopters and the men and women who will fight with all three of them.

The Marine Aviation Campaign Plan is a vision for Marine Aviation to attain the highest possible combat readiness to support Expeditionary Maneuver Warfare while at the same time preserving and conserving our most precious assets: our Marines, our Sailors, and our equipment. The Marine Aviation Campaign Plan incorporates technological advancements, innovative personnel management, balanced operations tempo, and Operational Risk Management to make our aviation units even more prepared for combat operations.

Readiness is a key transformation objective for the Navy and Marine Corps. In pursuing this readiness, we must also ensure that we are exhibiting good stewardship of taxpayer dollars and meeting our warriors' needs and expectations. From the government perspective, forging better partnerships with the rotary wing industry is key to meeting our future objectives. As competition for dollars increases, these partnerships will be even more valuable.

Our current partnerships with industry have achieved much. Key rotorcraft industry partners are (1) Sikorsky, (2) Lockheed Martin, (3) Bell Helicopter Textron, (4) Boeing, (5) General Electric Aircraft Engines, (6) Rolls Royce, and (7) Northrop Grumman. They and numerous smaller companies form a cadre of suppliers to the Navy/ Marine Corps Team - building platforms and engines, designing systems and tools for complex applications, and investing dollars into research and development. This Government/Industry Team has made significant progress in the transformational process.

The funding trend for Navy rotorcraft is rising as we transition more squadrons to these new aircraft. The MH-60R/S investment is \$8.3B FY04-09, and will increase an additional \$2.0B for FY10-11. Due to this increase in funding, expanded business opportunities exist for our rotorcraft industry partners in the future.

Some recent milestones within our community include the following:

The MV-22 is designed to replace the Marine Corps CH-46E and CH-53D helicopters. It will be the Marine Corps' only medium lift assault support aircraft. The CV-22 is designed to provide Special Operations Forces with a high-speed, long-range, vertical take-off/landing aircraft capable of penetrating politically or militarily denied areas to support special operational missions and activities. To meet interoperability requirements the V-22 must have communication assets and frequency coverage, encryption devices, and data link protocols that are tactically effective. V-22 is being designed to be interoperable with U.S., Allied, combined, and coalition forces.

After two aircraft mishaps that identified major discrepancies in the aircraft flight control system, specifically in the hydraulics system and software, the V-22 program underwent a major restructuring. That effort included independent program reviews that were comprehensive, with the

goal of ensuring that the organizational, technical, and programmatic issues have been adequately addressed, and the development of a plan that represented a rational approach to return to flight-testing and program recovery. I am pleased to report that the program is now in the second year of a comprehensive flight test program that continues to demonstrate that the changes made to the V-22 over the last three years are yielding the weapons system that is needed by the Marine Corps and the nation's Special Operations Forces. There are currently nine V-22s involved in developmental flight test at NAS Patuxent River, Maryland and Edwards Air Force Base in California. Another four Block A aircraft have been delivered to the Operational Test Squadron in New River, North Carolina in preparation for an Operational Assessment this summer and an Operational Evaluation scheduled to begin in January 2005.

We continue to work through the challenges facing our V-22 program, with positive results. We also have active oversight from the Office of the Secretary of Defense. All experts have been engaged, and we are performing to our test plan.

V-22 Test Team has flown over 1,200 flight hours since the return to flight in late May 2002. The V-22 program is produced by Bell Helicopter Textron, Inc., Dallas/Fort Worth and Amarillo, Texas, and The Boeing Company, Philadelphia,

Pennsylvania, with Rolls Royce, Indianapolis, Indiana, as the engine supplier.

The AH-1Z and UH-1Y inherit the multitude of missions from the AH-1W and UH-1N, coordinating, directing and executing attacks on ground targets in direct support of Marine Air/Ground Task Force operations. The AH-1W Attack Helicopter is tasked with escort, close air support, supporting arms control, visual and armed reconnaissance, anti armor, anti helicopter, and anti fixed-wing operations. The UH-1N is a combat utility helicopter tasked with airborne command and control, supporting arms control, special operations support, visual reconnaissance, and assault support operations. We are making great strides in our efforts to upgrade both aircraft.

Our current H-1 Fleet is facing obsolescence challenges on the modern, asymmetrical battlefield. There are 140 active and 46 reserve AH-1W's in the inventory, with an average age of 11 years. The UH-1N inventory today is 68 active and 10 reserve aircraft, with an average age of over 27 years. The H-1 Upgrade Program is the most cost-effective alternative to replacing these aging and obsolescent platforms.

The H-1 Upgrade program, with Bell Helicopter Textron, Inc., Dallas/Fort Worth, Texas, as industry lead, is remanufacturing 180 AH-1W and 100 UH-1N helicopters to state-of-the-art AH-1Z and UH-1Y configurations. To fill the UH-1N requirement, we

will reuse aircraft now in storage. Both the AH-1Z and the UH-1Y feature the latest technology in rotor and drive train design, avionics, sensors and weapons. Approximately 84 percent of the parts are common between these two aircraft, making them far more maintainable, supportable, survivable and deployable than current generation H-1 aircraft.

The UH-1Y complements the MV-22 in the assault support mission area, primarily in terms of small team insertions (reconnaissance and surveillance) and its ability to operate in restricted landing zones due to urban terrain and obstacles.

The AH-1Z will continue to provide fire support and escort for the Marine ground forces with increased time-on-station, combat radius and ordnance.

The H-1Z/Y Upgrade features the largest single-piece composite component ever built for a rotary wing aircraft - the rotor yoke. The rugged composite structure of the rotor yoke is currently proving the importance of these survivability advancements. Current ballistics testing results show that it can take a direct hit from a 23mm weapon and maintain sufficient "fly home" integrity. In place of the old analog cockpit, the aircraft upgrade includes an all-glass digital cockpit and incorporates the Thales Top Owl helmet-mounted display, which could become the standard Helmet Mounted Display for all Marine Corps rotorcraft. This helmet puts all flight data, Forward

Looking Infrared imagery and Night Vision imagery right on the pilot's visor in a look-through presentation. General Electric Corporation, Lynn, Massachusetts, manufactures the T700 engines for all H-1 Upgrade aircraft. The H-1 Upgrade program is a prime example of the importance of an Integrated Test Team. The H-1 Integrated Test Team is comprised of test pilots as well as military and civilian engineers, logisticians, and others who support the team. Members include active duty military, government civilians, and industry partners.

The SH-60B Seahawk is an armed multi-mission, ship based naval helicopter designed to extend the sensor range of surface combatants for anti-submarine warfare as well as performing surface vessel surveillance, targeting, and destruction. The aircraft is based aboard cruisers, destroyers, and frigates. The Navy currently has 149 in inventory with five of those belonging to the Reserves. The average age of these aircraft is 15.0 years. The SH-60B is anticipated being in service until 2016. In order to keep the aircraft in service that long, the airframe life has been extended from 10 thousand hours to 12 thousand hours. The active SH-60B squadrons recently supported Operations Iraqi Freedom and Enduring Freedom and continue to play a vital role supporting Surface Action Group operations in support of the Global War on Terrorism. The one Reserve

squadron continues to support counter-drug operations in the Caribbean and the waters off South America.

The SH-60F is a carrier-based version of the H-60 that provides close in Anti-Submarine Warfare protection for the Carrier Battle Group. The Navy currently has 73 in inventory with ten of them belonging to the Reserves. The average age of these aircraft is 11.9 years. The SH-60F is anticipated to be in service until 2015. As part of the Carrier Battle Group, these aircraft continue to play a vital force protection role during operations in support of the Global War on Terrorism.

The HH-60H armed helicopter is a carrier-based variant of the H-60 that provides the Navy with a multi-mission platform capable of conducting Navy's strike/special warfare support, Surface Warfare, and combat search and rescue. The Navy currently has 39 in inventory, 12 of which belong to the Reserves. The average age is 10.3 years. These will remain in service until 2013. Besides the inherent Surface Warfare capability, these aircraft were used to support coalition SOF efforts during the mine clearance operations that allowed humanitarian relief ships into the port of Umm Qasr, Iraq. Additionally, HH-60H's performed Combat Search and Recovery operations for a Navy F/A-18 pilot who was shot down over central Iraq on 2 April 2003. The two Reserve squadrons remain

mobilized and are currently supporting SOF missions throughout Iraq.

The Navy will retire the last of its H-46's by the end of this fiscal year. The H-46 has been the Navy's primary vertical replenishment helicopter but with an average age of 38.7 years, these helicopters are ready for retirement.

Additionally, two other aging airframes are due to be replaced in the near future. The Navy currently has 50 H-3's in inventory with an average age of 40.2 years. They are used in a utility role, executive transport, and for Search and Rescue. The Reserves have eight of these H-3's which support Fleet operations in the Southern California operating area. The Navy will retire these aircraft by FY08. The other aging aircraft in Navy rotorcraft inventory is the HH-1N. The Navy has 27 with an average age of 31.6 years. These aircraft are used primarily for Search and Rescue. The Navy plans to retire these aircraft by FY09.

The TH-57 helicopter is a five-seat aircraft designed by Bell Helicopter Textron, Inc. with a turbo shaft 250-C20 engine manufactured by the Detroit Diesel Allison Division of General Motors Corporation. The TH-57 is commercially known as the "Bell Jet Ranger." The mission of the TH-57 aircraft is to provide primary and advanced flight training for student aviators. The primary flight syllabus teaches the fundamentals

of helicopter flight including day/night familiarization and navigation. The advanced syllabus includes tactics, instruments and deck landing qualifications on a Navy Helicopter Landing Trainer.

The TH-57B/C is the Navy's only primary helicopter pilot training platform, and is expected to remain in that capacity until at least 2025. There are 123 are in the active inventory, with none in the reserves. All but two are at NAS Whiting Field, FL, tasked with training Student Naval Aviators in basic (visual) and advanced (instrument) helicopter flight. In this role, the TH-57 provides primary helicopter training at a TOC of \$508/flight hour, a figure that is significantly below any other fleet asset. The TH-57 has amassed over 1.5 Million Flight Hours since its introduction into the Navy Fleet in 1982. The average age of the fleet is 20 years.

Nearly all Navy fleet helicopters will have digital cockpits by 2012. To remain a viable and effective training platform that meets the training requirements of a digital helicopter fleet, the TH-57 cockpit is in need of modernization. The TH-57 must keep pace with the T-6 primary trainer (digital cockpit) and the rapidly changing fleet helicopter pilot training requirements, i.e., integrated digital avionics equipment and skills, and night vision (NVIS) operations. Due to current TH-57 cockpit limitations, digital cockpit skills and

NVIS training are performed in higher cost fleet replacement squadron (FRS) aircraft. Integral to the cockpit modernization effort, the TH-57 also requires energy attenuating seats to protect aircrews in the event of hard landings, and a torque and temperature exceedence warning system that will dramatically decrease transmission over-torques and engine over-temperatures that are frequently encountered in the training environment. The Navy's Helicopter Concept of Operations will ultimately reduce six different type/model/series of Navy helicopters currently operating to two new H-60 variants: the MH-60R and the MH-60S. The MH-60R configuration, currently being tested at Patuxent River, Maryland, will replace the aging SH-60Bs and SH-60Fs starting in Fiscal Year 2006. The inventory objective for the MH-60R is 254.

This new variant incorporates improved weapons, a new low frequency dipping sonar, imaging radar, upgraded electronic-support systems, and integrates the self-defense systems. The Navy will eventually buy 8 of these aircraft for the Reserves giving them identical capability with the active component.

The MH-60S was approved for full-rate production in September 2002 and is currently deployed with operational sites in San Diego, California, Guam, and Norfolk, Virginia. The Commander, Operational Test Forces assessed the MH-60S as operationally effective and operationally suitable on August 21,

2003. This aircraft is replacing the HH-60H, CH-46D, HH-1N, and H-3. The inventory objective for the MH-60S is 271. 16 of these aircraft are for the Reserves. The Sierra's primary missions are Anti-Surface Warfare, Combat Search and Rescue, Naval Special Warfare support and Organic Airborne Mine Counter Measures (OAMCM). These missions will be incorporated through a Block Upgrade plan. The Navy began receiving the first block upgrade in August 2003 giving the aircraft the first part of a two part OAMCM capability. The Navy will begin receiving the armed helo block upgrade aircraft in FY06 and the remainder of the OAMCM block upgrade aircraft in FY07. The Navy will replace the current Reserve SH-60F's and HH-60H's with MH-60S's, thus mirroring the Reserve component capability to the Active component's.

In January of 2009, under the current Helicopter Concept of Operations, Carrier Battle Groups will deploy with the new aircraft. It is projected that each Carrier Strike Group will have 8 Sierras and 12 Romeos. (6 Sierras and 6 Romeos per carrier; 6 Romeos on surface combatants and 2 Sierras per Combat Logistics Force ship) Each Expeditionary Strike Group could have 4 Sierras and 4 Romeos.

Sikorsky Aircraft Corporation, Stratford, Connecticut, manufactures the H-60 series helicopters. The H-60 has been in production since the 1970s. Additionally, Lockheed Martin

Systems Integration, Owego, New York, is the lead avionics integrator for both the Romeo and Sierra. General Electric Corporation, Lynn, Massachusetts, manufactures the T700 engines for all H-60 series aircraft. The airframe and engines are proven performers. The systems being incorporated in the aircraft are state of the art and will provide an enhanced capability for the crews of these aircraft to employ.

Dominant maneuver from the sea requires the rapid build up of force at the strategic point of decision. The H-53 provides the Navy and Marine Corps with the rapid heavy lift required to assure this capability. The MH-53E provides the dedicated airborne mine countermeasures critical to the Sea Shield, Sea Strike, and Sea Basing pillars of Sea Power 21. We are pursuing an Aviation Mine Warfare Concept of Operations that uses the MH-60S operating from within the Strike Groups. If this Mine Warfare Concept of Operations proves capable of dealing with the threats faced independently, then the future of the Dedicated Airborne Mine Countermeasure Mission will be determined.

Additionally, Vertical Onboard Delivery of some heavy/large critical logistics items for the Carrier Strike Group is possible only with this asset. We are studying the future requirements for Vertical Onboard Delivery and potential replacements especially as our Sea Base concept matures. The

Navy currently has 37 MH-53E's with an average age of 13.3 years.

The CH-53E allows the Marine Corps to transport its light armored vehicle and M198 Howitzer. The CH-53E is capable of lifting 32,000 pounds, transporting the load 50 nautical miles and returning (on a standard Navy day, with engines performing to specification). They can also retrieve downed aircraft. The aircraft are equipped with refueling probes giving indefinite range, and there are provisions to carry 55 troops. The capabilities of the CH-53E have been in such high demand from our operational forces that within the last three years, both reserve squadrons have been activated to participate in operations in Iraq or Afghanistan.

The CH-53D primary mission is transportation of equipment, supplies, and personnel during the assault phase and subsequent operations ashore. Capable of lifting 14,000 pounds, it is one of two Marine Corps medium lift helicopters scheduled to be replaced by the V-22.

H-53 industry partners are Sikorsky Aircraft Corporation, Stratford, Connecticut, and General Electric Corporation, Lynn, Massachusetts. The Marine Aviation Campaign Plan establishes the requirement to maintain the heavy lift capability through the year 2025 with a continuing need for heavy lift to support expeditionary maneuver warfare and the underlying concepts of

operational maneuver from the sea, other expeditionary operations, sustained operations ashore, and Sea Basing. In response to this requirement, the Operational Requirements Document for the CH-53X Heavy Lift Helicopter has been developed, and is in Joint staffing. In what will be a new development program, the CH-53X heavy lift helicopter will significantly increase the performance of the current CH-53E, and address maintainability, reliability, interoperability, survivability, and Total Ownership Cost (TOC) requirements. Moreover, this program will ensure that sufficient heavy lift helicopters will be available to our operational forces well through 2025, as our current force of CH-53E helicopters will see the retirement of roughly a squadron of aircraft a year starting in 2012 due to fatigue life issues.

The H-46 helicopter has been the workhorse of Marine Corps helicopter aviation for over 30 years. The Marine Corps CH-46E performs assault support, medium lift and transport of combat troops during amphibious operations and subsequent operations ashore. The Boeing Company, Philadelphia, Pennsylvania, built H-46 aircraft in the 1960s and 1970s. It has had several major upgrades including: airframe conversions of H-46D and H-46F to CH-46E in the late 1970s, and the Safety, Reliability, and Maintainability Program which started in the late 1980s and completed in the early 1990s. H-46 aircraft are powered by two

General Electric T-58 Series engines. The current plan is to retire all H-46D aircraft by 2004, and convert three CH-46E to HH-46E to fly search and rescue through 2015. The CH-46Es will gradually be reduced from the current 226 to 5 by 2015, the last year the H-46 will be in the rotorcraft inventory. USMC CH-46Es are scheduled to be replaced by the MV-22.

The VH-3D Presidential Helicopter mission, is to provide helicopter transportation for the President and Vice-President of the United States, members of the President's Cabinet and Foreign Dignitaries as directed by the Director, White House Military Office. The VH-3D fleet is augmented by the VH-60N aircraft.

Both aircraft are shipboard compatible and air transportable in C-5 and C-17 aircraft, and both have VIP cabin interior, extensive communications capability, self-contained navigation, and are Electro-Magnetic Pulse hardened.

Eleven VH-3D aircraft entered service in 1974/75, and nine VH-60N aircraft entered service in 1989 (eight are in service today - one attrition). Both rotorcraft are produced by Sikorsky Aircraft Corporation, Stratford, Connecticut.

The Presidential Helicopter Communications Systems are interoperable with applicable existing Department of Defense, White House Military Office, and National Command Authority systems.

The Presidential Helicopter Replacement (VXX) Program has been accelerated with an Initial Operational Capability scheduled for 2008. The VXX Program's Operational Requirements Document was approved by the Joint Requirements Oversight Council in December 2003. A limited competition for the VXX design, testing, and pilot production is on-going with contract award planned by May 2004.

As missions evolve, our acquisition processes are transforming to meet ever-changing demands in a joint operational environment. The Joint Requirements Oversight Council emerges as a principal forum in which senior military leaders address requirements from a joint perspective. For example, in a memo dated 23 August 2002, the Council validated and approved Change Three to the Operational Requirements Documents for the Mid-Life Upgrade to the UH-1 and AH-1, to include the interoperability Key Performance Parameters. Another example of Council involvement is the recent review and approval of both the Mission Need Statements and Operational Requirements for the VXX, MH-60R and MH-60S programs.

As the Naval services seek to re-capitalize, we do so with a blueprint that has been validated by recent world events. In the past, under the "two major theater war" construct, naval forces deployed in two major configurations: the Aircraft Carrier Battle Group with embarked Air Wings and the Amphibious

Ready Group with embarked Marine Expeditionary Units. Surface combatants and submarines did not typically deploy with the Amphibious Ready Group. This meant that in operations other than benign tactical conditions the amphibious ready group had to await in-theater augmentation from the Carrier Battle Group.

The new Global Concept of Operations organizes the fleet into Carrier Strike Groups, Expeditionary Strike Groups, and Surface Action Groups. This change involves more than just in-theater assignment of forces from Carrier Battle Groups to Amphibious Ready Groups, the new groups will train together and deploy as a cohesive unit. In addition it transitions our naval forces from 19 to 37 independent strike groups. Navy/Marine rotorcraft constitute the common thread that effects the realization of these concepts, and it is with this backdrop that we look ahead to transition the technologies required to accomplish our vision.

We watched closely as our Marines and Sailors have journeyed into harm's way in Operation ENDURING FREEDOM and Operation IRAQI FREEDOM, at times with NAVAIR by their side in the combat zone performing battle damage repairs. We continued to watch combat operations in Afghanistan and the Horn of Africa, and as fellow aviators in the Army battled on in Iraq. Sharing these lessons learned at the operator and acquisition

levels across services helped us prepare for the Marines' return to Iraq today.

In a tremendous story of cooperation and dedication we came together with industry and the Fleet to protect their aircraft from the current threat, as best we could. In record time we incorporated a series of survivability enhancements to our helicopters and refuelers, providing additional protection from shoulder-fired missiles. Where we could, ballistic armor has been added to protect from bullets. We began acting on these changes in November, and they continue today. Some will be completed before departure, some enroute and others on arrival. We remain in close contact with the deploying Marines, ensuring they have the absolute best we can provide.

These lessons are also translating into our newer programs. In several instances the equipment we buy today for an AH-1W will be retained and reinstalled on its replacement AH-1Z. Other aircraft like the V-22 have tremendous survivability enhancements built-in, from the ground up.

As in all Navy/Marine Corps programs, safety is of primary concern. The average age of helicopters continues to increase while operations in the most demanding environments such as Afghanistan and the Persian Gulf become the norm. The plans that have been previously discussed provide a roadmap to replace

aging aircraft with new aircraft that have improved capability to operate in these challenging environments.

The Navy and Marine Corps transformation is underway. We will continue to encourage our industry partners to seek innovative solutions to the challenges we face in meeting the Sea Strike, Sea Shield, and Sea Basing missions of the future. By working together we will be ready to take on new challenges and prevail against asymmetric threats.

Mr. Chairman, thank you again for this opportunity to share with the Subcommittee the challenges and successes of our Navy/Marine Corps rotorcraft communities.

DOCUMENTS SUBMITTED FOR THE RECORD

MARCH 4, 2004



Trade Facts

Office of the United States Trade Representative
October 6, 2004

www.ustr.gov

No New Subsidies

U.S. Acts to Stop New Airbus Subsidies, Including "Launch Aid" Loans

U.S. Files WTO Case to Level the Playing Field by Eliminating Unfair European Support for Airbus

Airbus has received subsidies in many forms, including launch aid, debt forgiveness, grants, equity infusions, and dedicated infrastructure support. These subsidies have seriously distorted the large civil aircraft market. The \$15 billion in launch aid is particularly significant because it shifts the commercial risk of airplane development from Airbus to the European treasuries.

Launch Aid Is Risk-Free Money:

- New aircraft development is risky. "Launch aid" shifts much of this risk from Airbus to the European governments because Airbus does not have to repay the launch aid if an aircraft is unsuccessful.
- Airbus has used launch aid to quickly roll out a succession of new aircraft.
- Repayment of large amounts of launch aid has been deferred or forgiven.
- Until recently, Europe claimed that launch aid was necessary to help an infant industry compete against a mature competitor, Boeing.
- Airbus now sells more planes than Boeing. Clearly, the time for launch aid has ended.

*"We will give Airbus the
means to win the battle
against Boeing"*

Lionel Jospin, French Prime
Minister, in the French
Assemblée Nationale, Reuters,
March 8, 2000

An "Infant" No More - Airbus and Boeing Are Now Peers:

	Airbus	Boeing
Global Market Share (2003 orders)	54 percent	46 percent
Global Market Share (2003 deliveries)	52 percent	48 percent
Defense Revenues (annual)	\$23.8 billion	\$23.7 billion

Time to End New Subsidies - The WTO Case Filed by the United States:

- The United States has urged the European Commission (EC) to negotiate a new agreement to replace the 1992 Agreement, which envisioned a progressive reduction in subsidies. This reduction has not occurred. The Airbus A380 is the most subsidized aircraft in history.
- The United States urged the EU to agree to end all new subsidies to commercial aircraft manufacturers, using the WTO definition of subsidy. The United States even offered to end all subsidies going forward.
- But the EU and Airbus appear to want more time for more subsidies for more aircraft. This violates international trade rules and is particularly inappropriate given Airbus' current market position. So the United States decided to bring this case to the WTO, in accordance with the procedures of the multilateral trading system.
- Launch aid and other government support to Airbus constitute subsidies under the WTO Agreement on Subsidies and Countervailing Measures (SCM). The subsidies are "actionable" because they are causing adverse effects to U.S. interests or "prohibited" because they are export-contingent or both. In 1999, in a case by Brazil, the WTO found that Canadian financing with launch aid-type terms was a prohibited export subsidy. Another panel, reviewing a case brought by Canada, found that Brazil's interest rate subsidies to its aerospace industry were also an export subsidy.
- The Request for Consultations filed today is the first step in the WTO process. If after 60 days the parties are unable to reach a solution, the United States would be authorized to request that a WTO panel be established to make findings on this matter. However, if consultations between the United States and the EC are productive, and progress is being made, the United States may allow the consultations period to run beyond the 60 day period.

Dispelling the Myths:

Myth #1: Boeing is Subsidized Through Various State Programs

- Airbus claims that potential tax reductions from Washington State for the 7E7 are equivalent to Airbus's launch aid.
- The Washington State program would only partially reduce the tax on sales of Boeing aircraft. By contrast, Airbus pays no sales tax (value added tax) on its exports.
- The potential tax reductions are in no way equivalent to the over \$6 billion in upfront development and production support that Airbus has received for the A380.
- Boeing will not receive any tax benefits under the Washington State program unless and until it invests its own funds to develop the 7E7 and begins delivering it to customers. The risk is entirely on Boeing's shoulders because, if the 7E7 is unsuccessful, Boeing will receive nothing. In contrast, if Airbus has an unsuccessful aircraft, it does not have to repay the money.
- In addition, the \$3.2 billion figure that some have linked to the Washington State package is an estimate of potential tax reductions over 20 years. Its value today even under optimistic assumptions is only a fraction of this amount.
- In addition to launch aid, Airbus receives substantial amounts of local support. The A380 alone received over \$1.5 billion. For example, the City of Hamburg spent approximately \$800 million for an Airbus production facility.
- Unlike the EU support, the Washington State tax reductions are available to everyone in the aerospace industry, including Airbus and its suppliers.
- Many states and localities in the U.S. and Europe have general incentive programs for companies. Airbus and EADS have taken advantage of such programs in Florida, Louisiana, and Mississippi, as has Boeing in Illinois. These programs are generally consistent with WTO rules because they do not injure foreign companies.

- o The United States is prepared to join the EC in identifying all types of state and regional incentives received by Airbus and Boeing.

Myth #2: Boeing is Subsidized Through Defense Procurement

- o Defense procurement is not a subsidy. When Boeing wins a government contract, it must provide a "good" to receive compensation from the government. Airbus, on the other hand, gets money from the government simply to subsidize the cost of developing airplanes, which it then sells in the marketplace.
- o In 2003, Boeing's defense revenues were \$23.7 billion. Airbus and its parent companies (EADS and BAE Systems) had combined revenues of \$23.8 billion.
- o EADS recently claimed that its own total outstanding defense orders (without adding BAE Systems) alone exceeded Boeing's.
- o Although U.S. defense contracts, which are subject to intense competition, do not constitute subsidies, the United States has an interest in ensuring that European launch aid is not repackaged to provide subsidies through defense procurement. As such the United States offered to address defense contracts as part of a new agreement.
- o BAE Systems is a major prime defense contractor in the United States.

Myth #3: Boeing is Subsidized Through R&D Spending

- o The EU claims that NASA and defense research contracts provide subsidies for Boeing's civil aircraft business.
- o Airbus and its parent companies have received billions of dollars in research and development funds from the EC and European governments.
- o The European Commission required Boeing to grant Airbus full access to Boeing's government-funded patents with potential application to civil aircraft as a condition for approving the Boeing-McDonnell Douglas merger. In contrast, Airbus and its parent companies are not required to share their patents with Boeing.

Support for Suppliers:

- Airbus claims that Boeing benefits from support that Japan may provide to certain Japanese suppliers to Boeing.
- The United States does not know the terms of any such Japanese support. However, regardless of the terms, Boeing is not related to its Japanese suppliers, and it conducts business with them on an arm's-length basis, paying fair market rates for its purchases.
- By comparison, European member states provide launch aid to suppliers of Airbus.

An Attempt to Cap Subsidies - 1992 Large Civil Aircraft Agreement:

- The purpose of the bilateral agreement was to limit and eventually eliminate entirely support to Airbus in return for a U.S. agreement to withdraw a pending GATT subsidies case filed in 1991. Before the creation of the WTO, in 1994, a losing party under the GATT could block follow up action, and the EU had done so in an earlier successful case against Europe over Airbus.
- The 1992 agreement was not intended to balance European subsidies and U.S. defense spending. Unlike launch aid, defense spending is not a subsidy.

"We are now operating within the 1992 agreement, and if we take the initiative of launching a new program, we will ask to benefit from the agreement so long as it has not been terminated."

Airbus CEO Noël Forgeard, explaining Airbus' plans to seek new launch aid for the proposed A350 (translated from an article in *Les Echos*, September 28, 2004).

- The 1992 Agreement does not prevent the United States or the European Commission from bringing a WTO case. Rather, its terms are explicitly subordinate to the parties' GATT and WTO rights.
- The 1992 Agreement merely insulates each side from self-initiation of trade actions under their national trade laws, i.e., their countervailing duty laws.
- Even if the EU were complying with the bilateral agreement, it would not be insulated from a WTO challenge. Compliance with the 1992 Agreement is not a defense against violations of WTO obligations.
- In light of Airbus' maturation into a highly competitive company, the bilateral agreement has outlived its usefulness. It serves only to perpetuate the continuing subsidization of Airbus, despite Airbus' peer status with Boeing.
- It is time for a new agreement that will eliminate new subsidies to either company for the development or production of large civil aircraft.

The Transatlantic Relationship – Partners in the Past And in the Future:

- The United States and the EU enjoy a strong and vibrant trillion-dollar economic relationship.
- The United States and Europe have a successful track record in managing disputes while continuing to work together to advance a shared agenda. For example, the United States and the EU were both key to launching the current Doha WTO negotiations, and they have worked together to advance global farm trade reform.
- In Geneva in July 2004, the United States and the EU were instrumental in developing with others the frameworks upon which the Doha negotiations will continue.
- Trade disputes are a normal part of a highly competitive global economic system, and both parties recognize the appropriateness of using the WTO process to resolve trade disputes. The WTO was created for just such purposes. In recent years, the United States and Europe have each brought about the same number of WTO disputes against the other.

**QUESTIONS AND ANSWERS SUBMITTED FOR THE
RECORD**

MARCH 4, 2004

QUESTIONS SUBMITTED BY MR. WELDON

Mr. WELDON. Your statement provides key measures of financial health for U.S. aerospace companies. Please provide similar data for European representative aerospace companies.

Ms. PATRICK. For a representative set of selected European aerospace/defense firms (EADS, BAE Systems, Finmeccanica, Thales and Rolls Royce), a simple average of these firms' performance by the same measures over the same period falls short of U.S. industry.

Operating margins at the end of 2003 were about 50 percent lower than the U.S. industry, averaging 4.8% vs. 10.3% for the S&P A/D Index. Return on invested capital likewise lagged slightly at 5.2 percent, versus a 6 percent return of the S&P A/D Index. The P/E ratio for the European firms at the end of 2003 was about 11.7, well below the U.S. A/D industry P/E ratio of 35, indicating a far less optimistic market outlook for future performance. Finally, debt service capacity measured as interest coverage is about 2.6x for the European firms, much lower than the S&P A/D Index at 6.6x, indicating a higher degree of leverage and financial risk.

Taken together, these observations highlight a disparity in fundamental performance and financial condition, but do not necessarily mean that the European Aerospace/Defense industry is in poor financial health.

Mr. WELDON. How will capabilities based decision-making fundamentally change the defense enterprise, as asserted on page 1 of your written statement?

Ms. PATRICK. Capabilities based decision-making brings with it a clear warfighter focus, the full operational context which must be considered in defining the solution, a decision framework for trading operational options, and a common vernacular for all involved parties. The impact of each of these to the defense enterprise is summarized here:

Warfighter Focus. Capabilities-based decision-making keeps the end result in the forefront of the process. The decision process ultimately affects the warfighter and this impact should be central to making acquisition decisions. By focusing on the broader warfighter needs versus specific Service needs, larger market opportunities are opened to defense enterprises.

Full Context. The capabilities framework brings with it a fully developed context in which to consider decisions. Providing industry the full context within which their products will operate offers industry opportunities to present alternative innovative solutions; solutions which a single Service may not have considered. It also affords industry the opportunity to more easily apply myriad applications of analogous technology across functional concepts and Service-specific platforms/systems. Such an innovative business climate helps to strengthen the U.S. industrial base.

Decision Framework. Capabilities-based decision-making provides a trade off framework that can be used to evaluate disparate options based on evaluating impacts on a common result—the warfighter capability. Unencumbered by individual Service bias, capability-based decision-making will allow DoD to more easily think of broader solution sets, and a broader field of solution providers. In the future, we could more readily think of loitering unmanned aerial vehicles competing with space-based communications relays. Directed energy weapons could compete with bombs. Hypersonic strike could compete with aircraft carriers. In contrast, decisions in the past have often been made without considering dissimilar alternatives—options that could be evaluated along common performance parameters can now be considered. This increased trade space will act as an incentive for industry to be innovative while providing clear on-ramps to the defense market for new offers.

Common Vernacular. Capabilities-based discussions can span program stovepipes as well as bridge the gap between the acquisition, requirements, and operations communities by using a common way to discuss the Department's needs and solutions—opening larger market opportunities than a single Service acquisition would provide. Applied in a global and commercial context this common vernacular provides a translation of warfighter capabilities into the technology and industry vernacular familiar to industry, allowing a clearer communication of the Department's capability goals.

Overall, capabilities based decision-making offers the Department an opportunity to convey what is needed and how it will be used while allowing industry to be innovative in offering solutions that serve a broader market.

Mr. WELDON. With regard to the "cartel-like" nature of the rotorcraft industrial base described in your statement, what actions were taken to change the factors that led to the cartelization of the industry to preclude the same anti-competitive practices emerging again with the Army's cancellation of the Comanche and diversion of a large part of the Comanche funds for remanufacture programs? What production efficiencies and remedial action have been instituted that will assure virtually guaranteed remanufacture contracts do not again lead to runaway program costs?

Ms. PATRICK. The term "cartel-like" describes the unintended consequences of—in effect—allocating production among the three U.S. helicopter companies that's resulted from strategies which remanufactured legacy platforms through sole-source contracts to the original equipment manufacturer rather than full and open competition for new designs.

Funds made available due to Comanche's cancellation have provided the Department the opportunity to return to a competitive acquisition process. Examples are the Army's Armed Reconnaissance Helicopter (ARH) and Light Utility Helicopter (LUH) competitions that are being put into place. In addition, the Navy also sponsored competition for the acquisition of the Presidential Helicopter (VXX). The Air Force's Personnel Recovery Vehicle (PRV) will provide another opportunity in the near future to stimulate competition. These programs will help stimulate innovation within the U.S. industrial base and also result in a strengthening of their global competitive positions.

Not all helicopter programs can be competed due to operational demands. The Department still has to manage a number of remanufacturing programs, such as the UH-1, AH-1, and CH-53 for the Marine Corps and CH-47, UH-60, and AH-64D for the Army. The Department has modified the UH-1, CH-53, and CH-47 programs from being remanufacture programs to being new build of existing design programs for two reasons: 1) combat losses have reduced the number of UH-1 and CH-47 aircraft available for induction into remanufacturing production lines; and 2) the cost of remanufacturing the UH-1, CH-53 and the CH-47 airframes have risen to a level equal to building a new airframe. Building new airframes removes many of the "unknown variables" which have plagued our remanufacturing efforts and caused unforeseeable cost growth, it also allows our deployed forces to continue to using their legacy assets longer.

Finally, the Department continues to work closely with industry to institutionalize Earned Value Management and Lean manufacturing across this sector. Unfortunately, there is no way to guarantee that the acquisition of complex weapon systems will not run into technical challenges or that changing requirements will not result in the need to change the programs and their associated costs. However, the Department is taking advantage of competition wherever possible in order to re-establish a more vibrant, responsive, and innovative industrial base.

It is through all the actions discussed above that the Department feels it can best control costs while obtaining the best weapon systems for the warfighter.

Mr. WELDON. Is there a national aerospace policy? If so, please provide.

Mr. BOGOSIAN. U.S. aerospace policy is a function of numerous public policy issues, including those concerning aerospace research and development; air transportation services economics and infrastructure; workforce development; regulatory oversight, particularly to ensure air transportation safety and security; international trade and foreign policy; space exploration, transportation and other services related to space; the development and acquisition of military aircraft, missiles, and other aerospace weapons; and antitrust considerations.

U.S. Government agencies work together to actively promote a robust and competitive U.S. aerospace industry. These agencies include the Departments of Commerce, Defense, Justice, Labor, State, Transportation, and the Treasury; the Federal Aviation Administration; the Federal Trade Commission; the International Trade Commission; the National Aeronautics and Space Administration; the National Science and Technology Council; and the Office of the U.S. Trade Representative.

Most recently, the Commission on the Future of the United States Aerospace Industry took a holistic view at the entire breadth of the many issues mentioned above and made certain policy recommendations organized under nine chapters. These chapters deal with an aerospace "vision", air transportation, space, national security, government, global markets, business, workforce and research.

My agency, the International Trade Administration of the Commerce Department, is concerned particularly with aerospace trade policy.

U.S. policy on trade in civil aircraft reflects the fundamental principles underlying U.S. trade policy in general. The United States seeks to achieve the exercise of free market forces to the greatest extent possible in the context of reciprocity between trading partners. Provisions of the Uruguay Round Agreements Act (PL 103-45) specific to civil aircraft (Section 135(c)) prescribe U.S. objectives in civil aircraft trade negotiations conducted in the World Trade Organization (WTO). These provisions call for the United States to obtain competitive opportunities for U.S. exports "substantially equivalent" to those afforded foreign products in the United States. Further, the United States will maintain "vigorous and effective" disciplines on subsidies practices and seek to eliminate tariff and non-tariff barriers to trade in civil aircraft.

A key objective of U.S. civil aircraft trade policy is to promote greater opportunities for U.S. exporters by reducing or eliminating market access and investment barriers abroad. The United States has encouraged countries seeking to accede to the WTO to become a signatory to the WTO Agreement in Trade in Civil Aircraft. While the opening of markets outside the United States for U.S. manufacturers and other U.S. exporters of civil aircraft may provide benefits to European competitors also seeking access to those markets, the United States does not seek preferential treatment for U.S. companies. For example, in concluding a 1996 bilateral Aircraft Market Access Memorandum of Understanding with Russia, the United States received certain market access commitments regarding "non-Russian" (and not "U.S.") aircraft.

Mr. WELDON. What is the European aerospace policy? Please provide.

Mr. BOGOSIAN. In contrast to the U.S. Government, European governments have a direct financial interest in their aerospace manufacturers. In the past, the largest European aerospace manufacturers were either entirely or largely owned by governments. This legacy continues today, with some government ownership of the major industry players. In addition to their ownership of equity, European governments provide "equity infusions" to boost aerospace manufacturers' operating capital and extend government "loans" contingent upon the manufacturers' success in the marketplace.

Certain practices of European governments observed by the United States may or may not reflect an aerospace "policy". These practices include using countries' pending accession to the European Union as political leverage aimed at increasing the sale of European aerospace products to those markets, at the expense of competing U.S. suppliers. Another practice has been the pursuit of regulatory measures, such as the EU aircraft noise "hushkit" regulation, that discriminate against U.S. products. The United States has taken action to oppose such practices, such as by initiating legal proceedings in the International Civil Aviation Organization that led to the withdrawal of the EU hushkit regulation.

The most recent expression of European policy encompassing the totality of the aerospace sector is the *Strategic Aerospace Review for the 21st Century* (STAR-21). Released in July 2002, this statement was prepared by European Commissioners and heads of large European aerospace manufacturers. Among its key recommendations, STAR-21 calls for fair competition in world markets, the provision of €100 billion over 20 years from public and private sources for aerospace research and technology, EU preeminence as a regulator of civil aviation, greater coordination in the EU of defense requirements and procurement, and adequate funding for European space initiatives.

Mr. WELDON. Please indicate the number of times the interagency group established to address the recommendations of the Commission on the Future of the U.S. Aerospace Industry report has met and the Commerce-action/policy actions taken or intended to be taken as a result of these meetings.

Mr. BOGOSIAN. International Trade Administration (ITA) and other Commerce Department representatives meet regularly with other federal agencies and the private sector through participation in multiple interagency initiatives that address recommendations of the Commission on the Future of the U.S. Aerospace Industry. Following are updates to some of the activities discussed during the Committee hearing:

Space: ITA staff participate in the White House Space Policy Coordinating Committee which is reviewing and revising U.S. federal space policies. Four new policies have been signed by the President over the last two years.

Air Transportation: The Commerce Department contributed to development of the Integrated Plan for the Next Generation Air Transportation System submitted to Congress in December of 2004. Commerce participates in the Senior Policy Committee chaired by the Secretary of Transportation, and staff from multiple bureaus participate in the integrated product teams outlined in the plan and coordinated through the Joint Planning and Development Office.

International Trade: The Commerce Department is participating in inter-agency reviews of multiple international trade agreements and policies affecting the aerospace industry (discussed in more detail in answers to questions four and six.)

Workforce: ITA staff participate in an interagency aerospace workforce revitalization task force coordinated by the White House Office of Science and Technology Policy. Among other things, the task force is assessing state workforce programs with a view towards expanding the most successful of them (such as a particularly beneficial aerospace mentor program in one state) to other jurisdictions.

Research and Development: ITA staff participate in the review of Administration policies on aeronautical research and development through the National Science and Technology Council's Aeronautics Science and Technology (S&T) Subcommittee. Subcommittee working groups currently are assessing federal S&T priorities, infrastructure, policies and related activities across relevant federal agencies.

Mr. WELDON. Please provide in as much detail as is available the degree to which foreign government market intervention in subsidies, tax policy, anti-competitive restrictions, biased standards and regulations, and export financing has disadvantaged U.S. companies and what has been done to correct these actions.

Mr. BOGOSIAN. The International Trade Administration (ITA) of the Commerce Department is involved in a wide variety of activities to address foreign government policies that have a competitive impact on U.S. aerospace companies. The nature and extent of such policies are catalogued in regular reports developed by Commerce and other federal agencies. ITA also is concerned about other government policies not outlined in these reports, such as aerospace-related standards and technical regulations used by foreign governments as trade barriers.

The *Annual National Trade Estimate Report on Foreign Trade Barriers*, developed by the Office of the U.S. Trade Representative and the Commerce Department, describes current trade barriers of concern to the Administration across all industries, including the aerospace manufacturing industry. For example, European government subsidies to Airbus and other European aerospace manufacturers are discussed. The *Annual Report to Congress on Subsidies Enforcement*, also jointly published by Commerce and USTR, describes specific subsidy programs being investigated by the Administration as well as steps taken to defend U.S. laws and regulations such as the European Union challenge before the World Trade Organization of the U.S. Foreign Sales Corporation rules. The *Annual Report to the U.S. Congress on Export Credit Competition and the Export-Import Bank of the United States* describes the role of government supported export financing in global aircraft sales and U.S. Government actions intended to ensure fair and open competition.

The Commerce Department is engaged in a wide variety of activities to address these barriers to aerospace-related trade. For example, we are seeking to eliminate aerospace-related subsidies that distort global markets through bilateral negotiations as well as consultations with European governments under the auspices of the World Trade Organization Agreement on Subsidies and Countervailing Measures. We also are working with other federal agencies to revise provisions governing officially-supported export credits through discussions with governments of other major aerospace-exporting countries. Commerce Department aerospace industry experts participate in development of global aerospace-related standards and recommended practices to ensure U.S. economic interests are fully considered, and these experts consult regularly with U.S. companies and foreign governments to address specific standards and regulations that distort competition.

Additional details on these and other trade policy issues, as well as U.S. Government activities to address them, will be provided in a forthcoming Commerce Department Report on Aerospace Market Developments and Government Policies. This report, prepared in consultation with the Department of Transportation and other federal agencies, is anticipated to be completed in early 2005 and will be made available to the U.S. House of Representatives Committee on Armed Services upon completion.

Mr. WELDON. The Commission Report concludes that federal acquisition policies currently fail to adequately protect commercial entities' intellectual property and inhibit providers of commercial products from doing business with the government. Does Commerce agree? If so, what is being done to correct this?

Mr. BOGOSIAN. In the typical Government contract, although the contractor has the right to own its inventions, the Government has some minimum rights. The Government's rights include a royalty-free license and the right to intervene if the company is not commercializing the invention. In addition, the Government may have unlimited data rights if it is fully funding the development. Those data rights,

however, are defined primarily by contract and procurement regulations pursuant to several statutes.

In the Department of Commerce, the Technology Administration (TA) handles intellectual property rights policy issues. When officials from TA have testified on this subject, they have found that the law that covers contractor inventions, the Bayh-Dole Act, has an appropriate balance of public and private rights. This is consistent with the 2003 report from the President's Council of Advisors on Science and Technology, which recommended no change in Bayh-Dole.

It is not clear that federal acquisition policies and statutes necessarily fail to protect commercial entities' intellectual property. This is because those policies implement the Bayh-Dole Act, which allows all contractors to own their inventions made with Government funds. Certain agencies may, under separate authorities (e.g., NASA under the Space Act and the Department of Energy under the Atomic Energy and Federal Non-Nuclear Acts) take title to inventions of large business subcontractors, subject to waiver requests. We understand that some companies may be unwilling to accept Government contracts because of the minimum rights the Government would receive in any contractor invention. These rights include the free license for Government use and march-in rights for any invention which is not being commercialized by the contractor. These rights are required by statute in 35 USC 210) and so the law must be changed to allow for the acquisition policies to change.

Mr. WELDON. On page four of your testimony you assert that aggressive pricing and financial support of European governments have compounded U.S. competitiveness challenges. (A) Please provide detail on Airbus' aggressive pricing practices and European financial support to Airbus. (B) What has the U.S. done to correct this? (C) Also please provide any objective comparative information regarding U.S. and European subsidies to their defense and commercial aerospace industries.

Mr. BOGOSIAN. The cited testimony refers specifically to the effect of Airbus' aggressive pricing and government financial support, among other factors, on Boeing's civil aircraft deliveries. The following replies focus on the large civil aircraft sector.

(A) Since the 1970s, Airbus has received billions of dollars in subsidies through launch aid, debt forgiveness, equity infusions, questionable export financing, grants and the provision of aircraft manufacturing infrastructure. With regard to just one type of these subsidies—launch aid—European Union Member State governments collectively have provided over \$15 billion. (Source: *Trade Facts*, October 6, 2004, issued by the Office of the U.S. Trade Representative.) Launch aid is funding that helps Airbus develop new aircraft models. Airbus has received launch aid for every civil aircraft it has produced.

Repayment of launch aid is contingent upon the commercial success of the aircraft program for which the subsidy was provided. It shifts the risk of entering a new aircraft into the marketplace from Airbus to European governments and their taxpayers. By lowering its risk exposure, Airbus is able to command lower interest rates on any funds that it does borrow to launch new aircraft or for other purposes. The U.S. Government has never provided launch aid to Boeing.

Details on Airbus and Boeing's sales prices are highly proprietary. For both manufacturers, it is widely accepted that actual sales prices of large civil aircraft can be significantly lower than so called "list" prices. Boeing's list prices are publicly available. Airbus' are not. Anecdotal information points to significant discounting of Airbus aircraft. For example, various press reports indicated that the first customer of the Airbus A380, Singapore Airlines, received a discount of between 30% and 40% from the list price of that aircraft (\$216 million) in effect at the time of the order (July 2001).

The problem is that the infusion of subsidies such as launch aid into one of two competitors can have an impact on the comparative final sales prices. Moreover, the same government funding can allow the subsidized competitor to offer non-price incentives, such as extremely favorable performance guarantees, that are beyond the non-subsidized competitor's ability to offer.

(B) In August 2004, President Bush made a public commitment to ending the subsidization of Airbus. The Administration has acted vigorously towards that end.

Because the European Commission had declined to enter into negotiations on this issue, the United States initiated proceedings in the World Trade Organization (WTO) in October 2004 that may lead to establishment of a dispute settlement panel being asked to rule on a U.S. petition that Airbus subsidies are WTO-illegal. Also in October 2004, the United States abrogated the 1992 U.S.-EU Agreement on Trade in Large Civil Aircraft because—as provided for in the agreement—the European Union failed to comply with its terms.

In January 2005, the Office of the U.S. Trade Representative (USTR) announced that the European Commission had agreed to enter into discussions aimed at concluding a new aircraft trade agreement within three months with the objective of

ending subsidies to large civil aircraft manufacturers. The EU stated that it agreed to a standstill of any new subsidies to Airbus during the negotiating period.

While the Administration welcomes this development, we are mindful of the difficult negotiations we face and that any negotiated solution to this issue will require compromises in both the European Union and the United States. In the meantime, seeking action in the WTO remains an option.

(C) USTR is coordinating the Administration's actions regarding Airbus subsidies. USTR has posted on its web site detailed information, attached, concerning subsidies to Airbus and alleged subsidies to Boeing.

[The information referred to can be found in the Appendix on page 165.]

Mr. WELDON. The AHS Executive Director stated that "significant research benefits are provided to European helicopter manufacturers by their governments." Could you please provide as much detail on these benefits as is available?

Mr. FLATER. European airframe manufacturers such as Eurocopter (an EADS company) and AgustaWestland (a Finmeccanica company) enjoy close partnerships with European government research agencies. For example, Eurocopter's relationship with ONERA (the French aerospace research agency) and DLR (the German aerospace research agency) strengthened in 1998 with an agreement aimed at creating effective rotorcraft research for the benefit of official services and industry in both countries.

In 1999, a common research program was created for a five year period covering eight research concepts, including;

- The Virtual Aerodynamic Rotorcraft
- The Smart Rotorcraft
- The Comfortable Rotorcraft
- The Advanced Rotorcraft
- The Quiet Rotorcraft
- The Safe Rotorcraft
- The Active Rotorcraft
- The Specialized Military Rotorcraft

The DLR/ONERA partnership was complemented in 1999 by a Research and Technology General Partnership with Eurocopter. Research projects were reviewed and refocused based on input from Eurocopter's Strategic Research and Technology Plan with specific customer needs in the forefront. This produced the following technology thrusts:

- Lower costs and shorter lead times; developing advanced design tools in all fields and especially fluid dynamics.
- Expanded operational capability; simplifying the piloting (digital flight controls and piloting aids) and developing new systems for ice and lightning protection.
- Environmentally friendly helicopters; designing quieter helicopters through passive and active control of rotor blades.
- Greater comfort with reduced cabin noise and vibration; integrating appropriate passive and active systems.
- Greater safety; optimizing crash protection systems.
- Active involvement in the European tiltrotor critical technology projects.

The cooperative activities of the three partners have been coordinated within a process called "Coordinated Action Programs." Significant research programs have sprung from this partnership and long term planning, both of which are giving Eurocopter a competitive advantage in several areas.

Advanced controls—Eurocopter, in partnership with DLR, is researching Fly-by-Light technology and smart material actuators on an EC-135 test aircraft. Near All-Weather Operability—With ONERA, Eurocopter is researching and testing sensors, displays and Man Machine Interface (MMI) technologies on an EC-155. This aircraft is fitted with a position finding system based on GPS and DGPS navigation, a mission computer to manage 4-dimensional flight plans and a 4-axis autopilot to allow steep approaches in zero visibility with DGPS guidance.

Efficiency & Noise reduction—Eurocopter is developing modern airfoils and planforms in conjunction with DLR and ONERA. Their stated goals are a five EPNdB noise reduction, a 6-10% reduction in Specific Fuel Consumption (SFC) and a 15 km/h speed increase.

Digital wind tunnel—Building off of work performed by ONERA & DLR on computational fluid dynamics, Eurocopter has been developing a digital wind tunnel capability in order to allow it to reduce development effort by 30%. This is part of their "virtual helicopter" study, another project with ONERA & DLR, which is aimed at reducing the time from conception to certification of a new helicopter to 3 years.

Over the past five years, the annual budget for these programs has been on the order of 20 million to 30 million Euros. Funding of the research is shared between Eurocopter and the agencies at generally a 50/50 split.

At the EU level, there are also programs that plan and fund technology programs over multiple years that are aimed at increasing the future competitiveness of the European helicopter companies. One example of this is under the European Commission's Fifth Framework research program, where Eurocopter & AgustaWestland have contracts to study tilt-rotor technologies over the period 2000-2005. The objective of the projects is to "Acquire/reinforce European knowledge and key technologies for the critical components designed around and aircraft architecture representative of a second generation of tilt-rotor".

Among the critical technology projects of this initiative are the following:

ACT-TILT (Active Control Technology for Tilt-rotor)—Definition and validation of the architecture and control laws of a tilt-rotor flight control system, using real-time man-in-the-loop simulation.

DART (Development of an Advanced Rotor for Tilt-rotor)—Design, manufacture and validation of a full-scale rotor suitable for an advanced European tilt-rotor aircraft.

RHILP (Rotorcraft Handling, Interactions and Load Prediction)—Tilt-rotor flight mechanics and controllability at low speed in the helicopter mode.

ADYN (Advanced European Tilt-rotor Dynamics and Noise)—Tilt-rotor behavior in forward flight in terms of dynamic stability and noise reduction.

TILTAERO (Tilt-rotor Aerodynamics)—Aerodynamic interactions between rotor and wing, rotor and fuselage in the hover and forward flight.

TRISYD (Tilt Rotor Integrated Drive System Development)—Design, manufacture and test of a full-scale integrated drive system

The first three projects are led by Eurocopter and the second three by AgustaWestland. In addition to the helicopter manufacturers, the team includes Mecaer and Teleavio of Italy, Gamesa and Sener of Spain, FHL of the UK, ZFL of Germany and a group of aeronautical research institutes (CIRA, DLR, NLR, ONERA, CTA), plus universities from the United Kingdom and Spain. IAI and P&WC are also partners in the program. The overall budget for all six critical technology projects is around 43M Euros, half of it funded by the European Commission and half by the industrial partners.

The EU Commission's Sixth Framework funds a project called FRIENDCOPTER, which addresses helicopter improvements relative to environmental and public acceptance. It features the following goals:

External noise levels 10 dB below the current ICAO/JAA rules especially during approach,

A reduction of fuel consumption up to 20% for high-speed flights.

Cabin noise levels below 70 dB similar to airliner cabins for normal cruise flight,

Cabin vibrations below 0.05 g corresponding to jet smooth ride comfort for the same flight regime.

The specific deliverables of the FREINDCOPTER program will include:

Low noise flight procedures especially for approach as guidelines for pilots

A technology of noise absorbing engine inlets and outlets

Methods to identify noise leaks in cabin & systems to actively and passively reduce cabin noise

A control technology to reduce rotor noise, vibration excitation, and fuel consumption by distributed actuation along the blade surface

A Mach-scaled wind tunnel model rotor ready for wind tunnel tests

Leaving aside the debate about which side of the Atlantic has the greater benefit from R&D subsidization, it seems clear the Europeans have a clear advantage in the collaborative relationship they have with Governments and their research agencies. This partnership results in a shared vision of what needs to be done to increase the European competitiveness in the rotorcraft industry, a carefully constructed, long term plan and consistent funding to get there.

By comparison, in the United States NASA has eliminated all funding for rotorcraft research in fiscal year 2006, effectively terminating the Army/NASA Joint Agreement to Collaborate on Rotorcraft Research which has been in place since 1965 (and renewed as recently as 2003). Pursuant to the Army-NASA agreement, the Army and NASA have shared leadership and funding for basic rotorcraft research. In addition, in recent years the Department of Defense budget for rotorcraft research has largely been refocused on improving existing rotorcraft airframes and developing UAVs as opposed to basic manned rotorcraft research. NASA has elimi-

nated all rotorcraft research associated with NASA's Vehicle Systems Technology program and shut down critical national aeronautics facilities, such as the National Full Scale Aerodynamics Complex (the 40'x80', 80'x120' wind tunnels) located at Ames Research Center and the Crash Safety Testing Complex located at Langley Research Center.

Mr. WELDON. The AHS Executive Director's statement also indicates that the rotorcraft product lines from Europe over the last five years equal and in some cases surpass our technology. Could you please provide more detail on these technologies?

Mr. FLATER. Technologies where European rotorcraft companies have made significant progress versus American rotorcraft include:

Active Blade Control (An advanced control scheme improving performance, while reducing noise and vibrations, using control elements integrated into the blade structure.)

Individual Blade Control (An advanced control scheme with similar goals as above, but using in-line hydro-mechanical actuators located in the blade control rods.)

Advanced Blade Planform Shapes (The main goal here is diffusion of blade vortex structure and mitigation of shock interactions when blades slice through trailing vortices of other blades; this phenomenon is also known as blade vortex interaction, or BVI.)

Advanced Performance and Noise Prediction Methodologies (The extremely complex, spiral wake system makes this a yet-to-be fully-solved analytical problem.)

Low Noise, High Efficiency Fenestron Technology (A special fantype antitorque system reminding observers of "little windows" or "fenestrons.")

Fly by Light (Germany's DLR is flying a dedicated EC-135 test-bed using fly-by-light technology.)

Speed of helicopters. (A-109 tests are underway.)

A string of new designs with advanced design integration resulting in improved performance and reduced operating costs.

CATIA (The most widely-used computer-assisted-design program in aerospace is of French (Dassault) origin.)

Mr. WELDON. What has been the level of the rotorcraft industry's IR&D funding each year for the past five years?

Mr. FLATER. The domestic rotorcraft industry is committed to rotorcraft research and advancing technology and safety. For example, the combined investment in rotorcraft IR&D by Bell Helicopter, The Boeing Company and Sikorsky Aircraft during the period 2000-2004 was as follows:

2000	\$183.4 million
2001	\$216.8 million
2002	\$128.2 million
2003	\$135.4 million
2004	\$162.0 million

While Sikorsky does not provide specific details of its company funded programs in the last ten years the company has invested well over a \$500 million dollars in the S-92, and well over \$100 million in dynamics systems and avionics/aircraft systems integration.

Mr. WELDON. What is the E.U. level of investment in aeronautics and related test facilities, each year for the past five years? Is comparable data available for Japan, China, and India?

Mr. FLATER. The E.U.'s spending for aeronautical research—which includes rotorcraft—has grown from just \$45 million (35 million Euros) in 1990-1991 to more than \$1.1 billion (850 million Euros) in the 2002-2006 Sixth Framework Program now underway. The focus of the Sixth Framework, developed by European industry in association with government, is all-composite wing and fuselage structures, efficient low-noise engines, and all-weather hazard protection systems. Europe's aeronautics research is pre-competitive, and performed by large consortia of industry and academia. It is focused on producing results that can be applied to products in the near to medium term. Research priorities are guided by a strategic research agenda fashioned by European industry with the openly acknowledged aim of wresting leadership of the civil aviation industry away from the U.S.

In addition to investments in major E.U. aeronautics programs, the component countries which comprise the E.U. and various regions within those countries have numerous domestic programs with spending levels which equal or, in some cases, exceed investments in R&D by the E.U.

By comparison, funding for NASA aeronautics will drop from well over \$1.2 billion in the mid to late 1990s to \$852 million in the 2006 budget request, to \$727 million

by 2009. This is 23% lower than projected just a year ago. Less than 10% of NASA's budget is for aeronautics—this will fall to less than 6% by 2010 as space exploration spending ramps up. The biggest fall in NASA's funding is in its Vehicle Systems Technology Program, which is cut from \$641 million in 2004 to just \$365 million in the fiscal year 2010 budget request. Rotorcraft research is entirely eliminated for the foreseeable future.

Nothing makes clearer NASA's intent to terminate all or nearly all aeronautics research than the fact that NASA has circulated an internal memo on February 3, 2005 declaring its intent to close a long list of critical aeronautics test facilities in 2006. These include the following:

10x10 Supersonic Wind Tunnel	Glenn Research Center
Hypersonics Test Facility	Glenn Research Center
Engine Research Bldg	Glenn Research Center
(Combustion and Turbomachinery Test Cells)	
Propulsion Systems Laboratory	Glenn Research Center
14x22 Subsonic Tunnel	Langley Research Center
Low Turbulence Pressure Tunnel	Langley Research Center
Vertical Spin Tunnel	Langley Research Center
National Transonic Facility	Langley Research Center
Unitary Wind Tunnel	Langley Research Center
8' High Temperature Model	Langley Research Center
Aerothermodynamics Lab	Langley Research Center
Scramjet Facilities	Langley Research Center
Landing Dynamics Facilities	Langley Research Center

So what will NASA spend its much reduced aeronautics budget upon? We are told that NASA will now focus entirely on four long-term demonstration programs driven by "environment" and "exploration" (e.g., a quiet subsonic aircraft which can't be heard except within airport boundaries, a zero-emissions aircraft, a lowboom supersonic demonstrator, and a remotely operated aircraft which can remain aloft for up to 14 days)—each demonstration tackles just one barrier, none of which are on industry's horizon for the next 10 years.

Effective with the current proposed budget, NASA fails to support any precompetitive 6.1 and 6.2 aeronautics research needed to advance aerospace, including rotorcraft, in the middle term. More important, in 2006—for the first time, NASA fails to support any basic rotorcraft research at the three Rotorcraft Centers of Excellence—the University of Maryland, Penn State University, and Georgia Institute of Technology—prompting large cuts in post-graduate training programs supporting future aeronautical engineers.

Mr. WELDON. What is your association's comment on DoD's characterization of the U.S. rotorcraft industry as a "cartel"—high unit revenues associated with rotorcraft remanufacture programs provide "robust financial returns—with little incentive for innovation . . . little real competition . . . since few contracts were competed; and they have formed industrial relationships among themselves that smooth revenue flow absent new program starts . . ." and "pressing operational needs are encouraging a complacent domestic rotorcraft industry to focus on the lucrative near-term revenues from remanufacture of legacy platforms and from after-market support"?

Mr. FLATER. These comments are from a working draft of a recent study by the Office of the Deputy Undersecretary of Defense (Industrial Policy), "The Vertical Lift Industrial Base: Outlook 2004-2005," issued in July 2004. The final report—which does not contain most of these references—incorporates responses from the rotorcraft industry leadership and the report's recommendations, contained in Part III (pp. 29–31), provide a concise roadmap involving government industry partnership to resolve some of the issues implicit in the quotes cited above.

The reference to "cartel" is inappropriate, since it was the DoD—not industry—that directed Bell and Boeing to team on the V-22 Osprey and Boeing and Sikorsky to team on the now-terminated RAH-66 Comanche. The emphasis on remanufacturing programs, as opposed to new-builds, derives from constraints placed on DoD budgets in the post-Cold War era and the fact that, by their very nature, such programs were sole-sourced to the original equipment supplier.

More recently, however, Bell Helicopter, The Boeing Company and Sikorsky Aircraft have—using internal funding—have introduced new lean-manufacturing equip-

ment, technologies and skill sets into their respective production lines. As a result, government customers can now purchase new-build Sikorsky UH-60 Black Hawks and CH-53 Sea Stallions, Boeing CH-47 Chinooks, and Bell H-1 attack and transport helicopters for prices equal to or less than remanufactured airframes. As a case in point, the Boeing Company recently announced a price reduction of \$12 million for a new-build CH-47F Chinook.

Additionally, the characterization that the domestic rotorcraft industry focuses on lucrative near-term revenues that provide "robust financial returns" does not reflect that profits realized from these types of contracts is limited by Government regulations and also the baseline established when the contracts were competitively bid. In fact, the structure of these types of contracts actually inhibits domestic rotorcraft suppliers from achieving world-class financial returns.

As the recent VXX competition and decision fully demonstrated, the characterization of the U.S. rotorcraft industry as uncompetitive and complacent is also inaccurate. The U.S. rotorcraft industry is fighting for its very survival in competing against extremely aggressive—and capable—European competition.

As previously noted, Sikorsky has invested hundreds of millions of its own monies to design, develop and build the S-92 medium lift transport. The S-92 technology innovations included a highly advanced dynamic system featuring a new rotor design, transmission, and active vibration control. The aerospace industry recognized the S-92 for creating a new standard in safety and performance in the industry, when the S-92 was awarded the American Helicopter Society Howard Hughes Award for "recognition of an outstanding improvement in fundamental helicopter technology" and the prestigious 2002 Robert J. Collier Trophy as "the greatest achievement in aeronautics or astronautics in America."

It is worthy to note that Sikorsky is the only helicopter manufacturer in the world to design, develop, and begin production of a new medium lift rotorcraft in the past 25 years solely through the investment of its own research and development dollars. By comparison, the governments of Europe have co-funded the development of three medium lift helicopters during this same period: Super Puma/Cougar, EH-101 and NH-90.

With respect to global market competition, the domestic rotorcraft industry has demonstrated throughout its history that when allowed to compete on a level playing field it has won the majority of competition against its European competitors. Over the last ten years, United States domestic rotorcraft OEMs have realized about a 37% capture of the aircraft ordered in the government medium utility market outside of Europe, but have only captured 6% of this market in Europe. Over the same time period, 92% of the helicopter orders within Europe have been awarded to European rotorcraft OEMs, while they captured only 18 % in the rest of the world. During this time, U.S. airframe manufacturers have won major competitions over European competitors in several countries including competitive wins in Canada (commercial and military) and Singapore just within the past year.

With respect to technology innovations, Sikorsky, Bell Helicopter, and The Boeing Company are currently developing fly-by-wire technology and other system integration capabilities that will provide a better total solution for the industry's customers.

Bell Helicopter is developing the "Modular Affordable Product Line" ("MAPL"), which is a suite of three advanced light helicopters based on maximum commonality of components for initial cost reduction as well as operating and support cost reduction.

The domestic rotorcraft airframe industry remains more committed than ever to implementing major changes and reforms that will reduce costs and impose a culture of innovation and responsiveness to customer needs, from introducing lean manufacturing capabilities into the factory, to developing state-of-art system integration capabilities. From eliminating warehousing to implementing new manufacturing cells based on the Toyota production model, Sikorsky is transforming to provide its customers with the best value proposition. An example of this transformation is that Sikorsky has doubled output for critical parts such as tail rotor blades, with significantly better yields and less "footprint" than just one year prior through the implementation of lean manufacturing. As several high-level government officials have witnessed first hand, including Suzanne Patrick (Deputy Under Secretary of Defense for Industrial Policy), industry members are making the radical changes necessary to render manufacturing operations leaner and more efficient and more competitive in the global market place.

QUESTIONS SUBMITTED BY MR. LOBIONDO

Mr. LOBIONDO. How many helicopters have been lost so far in Iraq and Afghanistan? How do you plan to replace them? Will the current competition for the Presidential helicopter influence your decision?

Admiral WINNS. We have lost a total of 21 helicopters (see table below) while in a deployed status since the beginning of OEF/OIF. Of the 21 aircraft lost, 12 USMC aircraft have been lost in Iraq and Afghanistan, 2 USMC aircraft were lost in Horn Of Africa, and 7 other aircraft were lost in various other deployed locations. The current production lines are closed on all our USMC aircraft, except the KC-130J. In order to mitigate these losses we will continue to push the transition to the MV-22 at the fastest rate possible. Additionally, the UH-1N and AH-1W losses are unable to be replaced, so we will continue our program to remanufacture older platforms into modern UH-1Y and AH-1Z aircraft. Unless we can start a "new build" production line for UH-1Y and AH-1Z, we will continue to suffer a shortfall in these platforms. The CH-53E shortfall will be partially mitigated if we receive requested supplemental funding for the restoration of 5 aircraft from AMARC. We plan to replace them through the PPB&E process. The current Presidential helicopter competition will not influence our decision to replace helicopter losses.

Count of BUNO	
TMS	Total
AH-1W USMC	4
CH-46D Navy	2
CH-46E USMC	2
CH-53E USMC	4
MH-53E Navy	2
SH-60B Navy	3
UH-1N USMC	4
Grand Total	21

Mr. LOBIONDO. Do you think there are other factors besides which helicopter can most securely and comfortably carry the President that should be given consideration in this process? If so, what would you identify as these factors?

Admiral WINNS. "The Naval Air Systems Command's Competitive source selection policy and procedures include the following standard source selection factors: Technical, Past Performance, Experience and Cost/Price. These are the factors considered in making the selection for the award."

Mr. LOBIONDO. What is the Navy's plan for equipping its rotorcraft fleet with aircraft survivability equipment?

Mr. LAUX. Our most immediate and dramatic efforts have been focused on engineering changes to in-service aircraft (such as the AH-1W), with the greatest attention and urgency placed on those aircraft in harm's way. As I commented in my written statement, we responded to the changing situation and threat abroad—the Fleet told us what they needed in each type aircraft and NAVAIR implemented every survivability upgrade before the aircraft flew combat missions. This will continue as aircraft rotate into theater.

The Navy and Marines have a long-term plan to address survivability, tailored for each type/model/series helicopter, driven by its mission and the threat. These include a variety of susceptibility and vulnerability reductions achieved through active and passive measures that run the gamut from extremely sophisticated missile decoy systems to simple armor. The Department of the Navy is actively pursuing these enhancements through production upgrades (such as the MH-60R/S) and completely new aircraft (such as the V-22). We continue to observe and learn from our own experiences as well as our sister services, and will continue to adapt to a changing world.

Mr. LOBIONDO. How many helicopters have been lost so far in Iraq and Afghanistan? How do you plan to replace them? Will the current competition for the Presidential helicopter influence your decision?

General HELLAND. We have lost a total of 21 helicopters (as of 4 Mar 04, see table below) while in a deployed status since the beginning of OEF/OIF. Of the 21 aircraft lost, 12 USMC aircraft have been lost in Iraq and Afghanistan, 2 USMC aircraft were lost in Horn Of Africa, and 7 other aircraft were lost in various other deployed

locations. The current production lines are closed on all our USMC aircraft, except the KC-130J, at this time.

So in order to mitigate these losses we will continue to push the transition to the MV-22 at the fastest rate possible. Additionally, the UH-1N and AH-1W losses are unable to be replaced, so we will continue our program to remanufacture older platforms into modern UH-1Y and AH-1Z aircraft. Unless we can start a "new build" production line for UH-1Y and AH-1Z, we will continue to suffer a shortfall in these platforms. The CH-53E shortfall will be partially mitigated if we receive requested supplemental funding for the restoration of 5 aircraft from Aerospace Maintenance and Regeneration Center. The current Presidential helicopter competition will not influence our decision to replace helicopter losses.

Figures are correct for the timeframe in which the questions were asked.

Count of BUNO	
TMS	Total
AH-1W USMC	4
CH-46D Navy	2
CH-46E USMC	2
CH-53E USMC	4
MH-53E Navy	2
SH-60B Navy	3
UH-1N USMC	4
Grand Total	21

Mr. LOBIONDO. Do you think there are other factors besides which helicopter can most securely and comfortably carry the President that should be given consideration in this process? If so, what would you identify as these factors?

General HELLAND. The Naval Air Systems Command's Competitive source selection policy and procedures include the following standard source selection factors: Technical, Past Performance, Experience and Cost/Price. These are the factors considered in making the selection for the award.

FISCAL YEAR 2005 NATIONAL DEFENSE AUTHORIZATION ACT—DEPARTMENT OF DEFENSE UNMANNED AERIAL VEHICLE (UAV) AND UNMANNED COMBAT AIR VEHICLE (UCAV) PROGRAMS

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE,
Washington, DC, Wednesday, March 17, 2004.

The subcommittee met, pursuant to call, at 2:01 p.m., in room 2118, Rayburn House Office Building, Hon. Curt Weldon (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

Mr. WELDON. The subcommittee will come to order.

Before we get into the meat of the witnesses of today's hearing on UAVs and UCAVs, we have what I think is a unique demonstration that I asked the staff to arrange and which appears now to be ready to go.

So, we are going to do that before we actually listen to the testimony, as we go over all of the UAV programs.

Here in our hearing room we have arranged logistically, to be able to control a UAV that is flying out in Arizona. And so, we would invite the audience, if they want to see this to come and just stand around here.

And I am going to ask Tony, who is the CEO of Advanced Ceramics Research (ACR), and they were one of the top Small Business Innovative Research (SBIR) firms for the Navy last year, and they are based in Tucson, Arizona, to explain the Silver Fox UAV and to explain what we are going to see.

And then he is actually going to demonstrate for us, as we see this UAV flying, what can be done with UAVs; not just his, but all of the others that we are going to talk about that are on static display here.

And I might add that Tony Mulligan's company, ACR, is actually flying UAVs right now in theater in Iraq.

And so anyone that wants to see this demonstration, I would ask to come up here and then once the demonstration is over, we will convene the hearing, in terms of the actual testimony.

Mr. Abercrombie, do you want to say anything before we get into the demonstration part?

[The prepared statement of Mr. Weldon can be found in the Appendix on page 223.]

STATEMENT OF HON. NEIL ABERCROMBIE, A REPRESENTATIVE FROM HAWAII, RANKING MEMBER, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

Mr. ABERCROMBIE. Yes.

The chairman's invitation was not rhetorical. Really.

Why don't we take a few minutes. I know that some of you are going to be interested.

Actually, everybody who wants to see it, can see it if they just be nice to one another.

Mr. WELDON. Tony, the mike should be on and we would ask you to introduce the head of the operation and research (O&R) team that actually is the funder of your technology, before you actually explain what is happening.

So, with that, I will introduce Tony Mulligan from Advanced Ceramics Research of Tucson, Arizona.

Mr. ABERCROMBIE. And I just want to say, Mr. Chairman, there is no truth to the rumor that this is a subcontractor to Weldon Graphics.

Mr. WELDON. That is right.

Tony, it is all yours.

Mr. MULLIGAN. Thank you, Mr. Chairman and other members of the subcommittee.

What we are demonstrating right now is actually about an hour ago, we launched two Silver Fox UAVs.

I would also like to acknowledge Admiral Cohen, from Office of Naval Research (ONR), who has been sponsoring this work and the ONR personnel that are here right now. This program was funded by ONR and is supported by them.

What is happening right now is we have two Silver Foxes that are flying in the desert in Tucson, Arizona, and they are following the green dot, which is a laptop ground station, which is in a convoy.

So, the convoy is transversing through the desert and wherever the convoy travels, the aircraft follow it.

So, if the convoy stops, then the aircraft will orbit round the convoy. So, basically the person driving the convoy with the steering wheel, gas pedal and brake pad is operating both of the UAVs. So, they autonomously follow them.

This software is called AINS Software, it is Autonomous Intelligent Network Software, championed by Dr. Allen Moshfegh from ONR.

Basically, it allows you to do multiple vehicles at the same time.

And what we are doing is we are running the video on the left side, through a small satellite uplink, which cost less than \$10,000 and it actually provides a live video stream, but here on the House internet, the firewall is such that we can't run video continuous video stream. So, it is greatly affecting the resolution.

In the operation, or if we were at another site connection, that didn't have the firewall, you would see a full, high resolution video going.

These planes will fly for up to 17 hours on heavy fuel, with a full gas tank configuration. And right now, they are configured with half gas tanks, which gives it about a nine-hour duration time. And they are launched by being hand-launched into the air.

Mr. WELDON. Cost per copy?

Mr. MULLIGAN. The fully loaded version with all the Infrared (IR) camera and the 72:1 zoom color camera is under \$40,000. It is between \$35,000 and \$38,000 depending on specific options.

Mr. WELDON. How much in long term, just a multiple?

Mr. MULLIGAN. These prices are based on low-volume production; building one to 10 at a time. We believe that building a few hundred at a time will drop the price to a number around a third of that cost, or less.

Mr. WELDON. So the resolution that you have here is standard? You can bring it in closer, you can zoom?

Mr. MULLIGAN. The video can be zoomed in up to 72. It is a standard off-the-shelf camera. The IR camera is a camera typically used by firemen on their helmets and our next generation that is coming out with a gimbaled camera, so you can point the cameras at your target, or whatever you want to look at.

Mr. WELDON. So, you have two running simultaneously here following the caravan.

Mr. MULLIGAN. There are two running simultaneously, following the caravan, being operated from one IBM ThinkPad laptop.

Mr. WELDON. Now, are the Marines currently using this?

Mr. MULLIGAN. The Marines are preparing to use it. We are shipping four units out with one Marine Expeditionary Unit (MEU).

Mr. WELDON. Any questions from Members?

Neil.

Mr. ABERCROMBIE. You say that it is being controlled right now from the ground, from the convoy on the ground? Right? In a sense of following?

Mr. MULLIGAN. Yes, sir.

Mr. ABERCROMBIE. Now, how does it work under conditions: battle conditions, conditions elsewhere? How would it work?

Mr. MULLIGAN. Well, it would work the same way. The ground station has its own location global positioning system (GPS) device, and so it pays attention to where it is moving and it calculates its course.

And it looks at where it is and where it is and it looks at where the aircraft air and where they are going and it derives new way points so that the aircraft will be in the right place, relative to the convoy.

So, it would the same in theater, as it does in Arizona.

Mr. WELDON. Any other questions from Members?

Mr. MULLIGAN. I would like to add, also, you can manually set the programming for the airplane at any time. You can override it at any time. Or you can preprogram it for the entire flight and not interfere with its flight path.

Mr. WELDON. Very good. Thank you very much for the demonstration.

Now we will proceed with the hearing.

Thank you very much, Mr. Mulligan.

Mr. MULLIGAN. Thank you, sir.

Mr. WELDON. We want to make the statement that we are not endorsing anyone's technology, as there are going to be a number of technologies that we review today.

And the services are all doing equally excellent work in UAV programs, which is why we have this hearing. And we are going to assess that work and the success of it.

And we have a number of static displays of UAVs in the front of the room. In fact, I believe we have one from each service. Is that correct: we have a UAV from each service?

As we go through the hearing today, we will try to point out each of the UAVs that are here, so Members get a complete picture of UAV technology.

And in beginning the hearing, let me also add that we tried to get the video footage that was released on national T.V. just yesterday of a UAV that took photographs, allegedly, of Osama bin Laden several years ago.

We were not able to obtain that video footage from the UAV, but this has become a major topic now in the country.

And on our trip that I led to Iraq and Afghanistan three weeks ago, one of the overriding issues that we heard from our military leaders: from General Odierno of the 4th Infantry Division (ID) to the troops on the ground, was the need for additional UAV capability.

We have conveyed that message to the Army and to our senior leaders and they are responding as aggressively as possible.

And so, this hearing is to continue the process of looking at this technology and where we are and where we are going.

Now, I would like to pause for a moment to acknowledge the valiant men and women in our armed forces, our coalition forces and civilian personnel who are leading the fight against global terrorism, both in-theater and around the world.

Recent events in Spain only serve to emphasize the pervasive nature of this problem.

We extend our condolences to the families and loved ones of those who have been injured or have given the ultimate sacrifice fighting to defend the fundamental freedoms on which our Nation was founded.

Our prayers are with those in harm's way around the globe, and we hope for their safe return.

This afternoon, as I mentioned, the Tactical Air and Land Forces Subcommittee is meeting to receive testimony on the Department of Defense's unmanned aerial vehicle programs. We did a similar hearing on this issue last year.

I would like to welcome today our first panel: from the Government Accountability Office (GAO), Mr. Neal Curtin, Director of Defense Capabilities and Management; and Mr. Paul Francis, Director of Acquisition and Sourcing Management.

Our second panel member is Dr. Glen Lamartin, Director of Defense Systems for the Office of the Secretary of Defense (OSD).

And our third panel will be Lieutenant General Walter Buchanan III, Commander of Central Command Air Forces and Commander, 9th Air Force; and Major General James Thurman, Director of Army Aviation Task Force.

Mr. Curtin and Mr. Francis will present testimony based on their extensive work on the subject of UAV programs and will contribute both a historical perspective and discuss their recent findings, which we requested a year ago, which you now all have copies of,

which is just now being released today. This is a result of our action last year.

Following their testimony, Dr. Lamartin will present the DOD perspective on UAV acquisition, including the DOD UAV Roadmap to the future.

And to complete the picture, General Buchanan and General Thurman will provide the warfighter perspective on the use of UAVs, both in combat and post-combat operations.

You will notice that we have a static display, as I mentioned, of operational, small UAVs from each of the services that will be available for examination following the hearing.

In fact, I wanted to fly one over the Capital, but as you can imagine, that was a little more difficult than even I could undertake successfully, but we tried.

I have, since the mid 1990's, when I was chairman of the Military Research and Development Subcommittee, advocated an aggressive fielding of UAVs.

Recent conflicts have demonstrated their utility, and today, UAVs are an integral part of our intelligence and military operations.

Though UAVs continue to prove themselves daily, the cultural opposition within the services has not been overcome. Nor has the resistance to one service adopting a UAV developed by another service. And that is really, unacceptable.

I continue to be concerned that though OSD and the services have developed a UAV acquisition roadmap, compliance is not mandatory, and services are free to do as they wish.

OSD, after having gone to all the effort to jointly develop a logical UAV acquisition roadmap within the services, should have a mechanism to ensure that UAV acquisitions within the Department conform to that roadmap.

Though small UAVs cost comparatively little individually, in aggregate the cost is very significant as we seek to procure hundreds, perhaps even thousands.

There should be a competitive selection of each class of UAV, from high-altitude endurance to small, man-portable UAVs. Only in this way will the warfighter get the most capability, while the taxpayer gets the best price.

I am pleased to hear of the recent decision that the Navy intends to competitively select a system to meet its Broad Area Maritime Surveillance (BAMs) requirements.

The Joint Unmanned Combat Air System (J-UCAS), is another area of concern. The schedule and missions are still unclear. In addition, the program has now been moved again, this time to Defense Advanced Research Projects Agency (DARPA).

It is not clear to me that DARPA is the preferred location rather than having a military service execute development and acquisition.

I am very interested to hear the various witnesses' comments on this program.

Before we get started, the last point I want to make is that UAVs are sensor platforms. And if the sensor information does not get to the users, UAVs have little value. Standards resulting in interoperable systems are the key to successful UAV operation.

Any place where a system can be standardized, such as by using a common link, such as the Tactical Common Data Link, or TCDL, builds in inherent interoperability. Joint service use of a common UAV offers the same advantages.

Before we proceed with the first panel's testimony, I would like to recognize my good friend from Hawaii, Mr. Abercrombie, who is an advocate for UAVs, in fact, I understand he wants to test them in Hawaii, which all of us want to come to be a part of, for any remarks he would like to make.

Mr. ABERCROMBIE. Mr. Chairman, thank you very much. I would be delighted to have you do that, but unfortunately, you have just demonstrated that you can see everything we are doing in Hawaii sitting right in that chair.

So, I guess you won't have to come out.

Mr. WELDON. Can't you convince us to come anyway?

Mr. ABERCROMBIE. Mr. Chairman, I just want to tell you I have been very quickly through the GAO report and I think it best now that we move immediately to the testimony because I think this report, in typical GAO fashion, doesn't waste words and lays out the essentials of the argument quite clearly.

Mr. WELDON. I thank my good friend and distinguished Ranking Member.

Let me turn to distinguished full committee Ranking Member, our good friend, Ike Skelton, for any comments he would like to make.

With that, and use of time, we will encourage each witness to keep their opening oral statements short and focused so that we can get a greater number of questions.

Without objection, all written statements will be included in the record.

We will now turn to panel one. Mr. Francis, the floor is yours. Mr. Curtin, after finishing, can proceed.

Oh, Mr. Curtin is first. Okay.

STATEMENT OF NEIL CURTIN, DIRECTOR, DEFENSE CAPABILITIES AND MANAGEMENT, GENERAL ACCOUNTING OFFICE (GAO)

Mr. CURTIN. Thank you, Mr. Chairman. I appreciate it. And Members of the subcommittee, we do have kind of a tag team today and I appreciate your willingness to do that.

The way we did our statement and our oral presentation this morning kind of reflects the nature of the work we have done. I have worked on the report that we are issuing today. And I will summarize briefly the key points of that.

Mr. Francis, you have been involved in a lot of our past work and will pick up on some of the key themes that we have seen in our work on UAV systems and some of the challenges for the future.

Let me start with just a few points. I think in three points here I can summarize our new report. We called it, Improved Planning Can Enhance DOD's Unmanned Aerial Vehicles's Efforts, and that is really the crux of what we are getting at.

First point: interest in UAVs and the amount of money being spent on UAVs is increasing rapidly and Congress has been extremely supportive of UAV programs.

Our report points out that from fiscal year 1999 to 2003, Congress appropriated \$400 million more than what DOD had asked for in RDT&E and procurement: \$2.7 billion over that five-year period.

And you can see the growth: DOD's fiscal year 2005 acquisition request is over \$2 billion for the one year and DOD's roadmap talks about spending increases up to as much as \$3.2 billion per year by 2009, if you look at the total cost to acquire and operate our UAVs at that point.

All the services, as well as the Special Operations Command and DARPA have multiple UAV programs at various stages. By some counts, at least 10 systems were used in some way during Operation Iraqi Freedom (OIF), many of those systems still in development.

And the early reports we are hearing are that performance of the UAVs, both in Iraq and Afghanistan, have gotten generally high marks and have created even new interest and enthusiasm; showing value to the warfighter for UAVs.

Second point: we believe DOD has made some good progress in the past few years, better coordinating these numerous UAV initiatives underway throughout the department. The establishment of the Joint UAV Planning Task Force in 2001 was an important step.

It did bring about a more of a department level focal point for UAVs. The task force spearheaded creation of the 2002 UAV roadmap, which represented improvement over previous efforts and has set some needed goals and priorities; some needed goals and priorities.

And the task force has also been able to influence some military service decisions to improve program management.

So, there are some good, positive steps coming out of this, but I am going to have to add our final point, which is despite those positive steps and accomplishments, we still believe DOD could do some things that will further enhance its management of the UAV programs. Our report recommends two actions.

First, we recommended that DOD take the current UAV roadmap up to a higher level: create a real, comprehensive, strategic plan for UAVs.

The roadmap has some of the elements you would want in a strategic plan, but needs some more pieces to become a more robust document, that can really serve as a guide for UAV development and use.

We would especially like to see closer tie-in between the OSD roadmap and the roadmaps that the individual services have done. And a true, strategic plan could do that.

Second, we recommended, with the strong, strategic plan, DOD needs to have, either was planning the task force, that currently exists, or some similar organization to have more formal authority to really oversee and implement such a strategic plan.

Our concern is that as funding increases, new programs get further down the road, a coordination role, which was what the current Task Force plays; it may not be enough.

There may be a need for designated office to really make some of the tough calls that are going to be necessary.

We are not advocating a return to a central defense agency, like DARPA, to control all the funds, but when we think of strengthening the current organizations and what is called for, then maybe that is a good point to turn to Mr. Francis for some of the past work that helps kind of, reinforce that point.

[The joint prepared statement of Mr. Curtin, and Mr. Francis can be found in the Appendix on page 229.]

STATEMENT OF PAUL L. FRANCIS, DIRECTOR, ACQUISITION AND SOURCING MANAGEMENT, GENERAL ACCOUNTING OFFICE

Mr. FRANCIS. Good afternoon Mr. Chairman, Members of the subcommittee.

I wanted to draw from our body of work on UAVs to make a few observations, particularly on what it has taken to succeed in the past; what are some of the challenges that the future presents; and what the implications might be for leadership in the future.

First, I think that past experience has shown that success has taken special measures with UAV programming. We have reported on a number of common problems over the years which have deferred some programs and the cancellation from others.

Among these problems, I would number requirements creed, risky acquisition strategies, uncoordinated efforts on the part of some of the services, which I think, has diluted some of the investment.

And in some cases, what I would call tepid, funding support by some of the services.

I think, in contrast, the successful UAV programs have required eight typical measures. They have not been products of the traditional acquisition process.

Rather, they have gotten their start as Advanced Concept Technology Demonstrators (ACTDs), or advanced technology demonstrators.

Moreover, each of the successes has required, and in fact, gotten top level management intervention, usually that has been necessary to resolve funding problems and requirements issues.

I think the recent example of the unmanned combat vehicles: a good case and point.

We reviewed that last year and I can get into more detail during Q&A, but it is our view that had OSD not temped, in particular the Joint Planning Task Force, I don't think that would be a viable program today.

The second point I would like to bring up: what are the challenges we have in the future for UAVs? I think the first thing we keep in mind is the past problems and challenges haven't gone away completely, so they will still be there to meet.

But in addition, we will be looking at UAVs in greater numbers. I believe DOD estimates they quadruple over the next decade.

You will also be performing more critical missions. I think we are moving out of the realm of the, nice-to-have UAV, which is an extra set of eyes for the commander, to the must-have UAV.

UAVs are performing lethal combat missions, performing critical surveillance roles and functioning as nodes in the communication networks.

And these are very significant missions and some missions that are currently performed by a manned aircraft today.

I think the final challenge for the future is competition for additional resources. With the larger number of programs and the higher dollars, there will be competition, I think, not only for money, but also for frequency spectrum bandwidth and airspace.

This leads me to my final point which is, "What are the implications of these challenges for management?"

And I think, clearly, we believe that strong management will be key to meet these challenges in the future.

And I would join Mr. Curtin in saying that we think that DOD should build on the successes of the joint funding task force and strengthening an organization like that for the future.

When I think back on some of the successful interventions from OSD and this office, a couple things come to mind. One is: will that mode of operation scale up to the challenges of the future?

And will the leadership that has been provided by the individuals in those offices convey to their successors?

Because I think if they do not, then we run the risk of diluting the investments we are going to make in the next decade and maybe not get the type of outcome we would like to get. And I know that has been a concern of this subcommittee.

Mr. Chairman, that concludes my opening remarks.

[The joint prepared statement of Mr. Francis and Mr. Curtin can be found in the Appendix on page 229.]

Mr. WELDON. We thank you both for appearing today and more importantly, thank you for your excellent work in this study on our behalf. It will be of great use to us as we go through the mark-up process this year for next year's defense bill.

And I take note, that of the recommendations that you made, and we will talk to the representative of OSD in a later panel, partially agree with your first suggestion, but disagreed with designating a UAV task force or appropriate organization to oversee the implementation.

And we are going to be focusing on that, and I would just let our other panelists be prepared, know to be prepared to respond to that.

One of the things we didn't ask you to do, which I would like to ask you maybe comment upon, or maybe have you go back and look at, is something that greatly concerns me, with the unbelievable addition of all these small UAVs.

The capabilities are also, obviously, very much available to our adversaries.

And could you in fact, or have you in fact, looked at the threat posed to U.S. and allied forces from an adversary having maybe the level you would get from a model airplane store of a swarm of UAVs and what they could do?

And should we be doing more in that area, in terms of assessing what our response would be? Has the GAO looked at that yet? I know that wasn't a part of our original study, but has there been any work done in that area?

Mr. CURTIN. Yes. I can comment on that.

In fact, there was a hearing a week ago from our international affairs side. The House International Relations, I believe, had

tasked them to look at this issue of proliferation of both UAVs and cruise missiles.

And we looked at the export controls; we were afraid that with all the technology being developed here by companies like this that can be used by people who might not have quite the same viewpoints that we do.

And there are some issues there, concerns about weapons of mass destruction even being put on UAVs; chemical or biological systems.

And there are some dual-use export control issues that we pointed out in that report. We can certainly get that to you——

Mr. WELDON. So, you made recommendations in that report? I haven't seen it.

Mr. CURTIN. For tightening of the export controls. That was the key. We felt it wasn't a threat assessment of what is out there in other countries, but it was U.S. technology being exported for this type of UAV technology.

And we did have some recommendations for tighter export controls for State Department and the other agencies involved in that.

We can certainly get you that and talk to your staff about whether there is additional work there that we could do.

Mr. WELDON. Yes, we would love to have you pursue that.

One final question before I turn to Mr. Abercrombie.

What is so frustrating to me, as a strong supporter of our defense industrial base and our capability is the range of prices on UAVs. We will see UAVs come in with price tags in the million dollar ranges. And then we will see one that sells for \$30,000.

And when you do a side-by-side comparison of a smaller one, some of them have very disparate capabilities, but the capabilities are not directly based on who has the highest price.

What should we do? Is it because these small entrepreneurs are better able to respond, than perhaps the larger defense contractors?

What is the reason why we are seeing so much aggressiveness and successful aggressiveness on the part of the small entrepreneurs with these low costs UAVs who seem to have much greater capability than some of the ones that are much more expensive?

Mr. FRANCIS. I think, obviously, that would require a little bit more study on our part, but I would think one of the first things would be the amount of overhead, as you suggested.

The smaller firms would have relatively low overhead and can do a UAV, I think, relatively inexpensively. That would be the first thing to come to mind.

The next would be whether, in fact, the capabilities are quite equal and the technologies are pretty similar.

So, I think there would be a real issue if, when we looked at those, the quality of the air vehicle and the payload were the same and the price was significantly different.

The big cost drivers are the air frame itself, but then the propulsion system, which is probably about the same as the air frame. And then the sensors that go into it and you can have some pretty big price differences in the different types of sensors.

And I think there is a lot of research going on on the engines and propulsion systems, too, that could throw your costs into those kinds of ranges.

But I agree, it is a perplexing question and I don't know if we have done enough work to answer.

Mr. WELDON. Thank you very much.

Mr. Abercrombie is recognized.

Mr. ABERCROMBIE. Thank you.

You probably were immediately suspicious when I complimented your report as not wasting words and getting right to the point.

Mr. CURTIN. I am never suspicious of a compliment. I appreciate that.

Mr. ABERCROMBIE. But, what I need is an answer, because you have zeroed right in on, and haven't wasted words, but I am confused as to the why.

Can I cite a couple things to you in the report and then ask you to comment?

Mr. CURTIN. Sure.

Mr. ABERCROMBIE. And I will just go to the summary, because obviously, not everybody in the audience has had a chance and I guess we are on television, so they wouldn't have had a chance to look at this.

So, if you to your highlight page in the beginning and what GAO recommends "DOD partially concurred with one recommendation, disagreed with the other, saying it did not need to provide more authority for an organization within the department" and then you continue to support it.

If you go to page six, at the bottom of the last paragraph there; I am going to quote again, because not everybody has this, "Since our 1988 report, the overall management of defense UAV programs has gone full circle" and then you go on at some length and detail to explain what the logistics of that full circle was all about.

And for conversation's sake, I am going to accept that, that it has, in fact, come full circle.

In 1989, what you meant by that, was in 1989, the director of defense research and engineering set up a UAV Joint Project Office as a single DOD organization with management responsibility for UAV programs.

And in a sense, they have come full circle, since 2000, DOD has taken positive steps to improve the managing of the UAV program.

In October 2001, the Undersecretary of Defense for Acquisition Technology and Logistics (AT&L) created a joint UAV planning task force to function as the joint advocate for developing and fielding UAVs, which to me, sounds like the same thing that they had essentially in 1989.

Is that a correct understanding of your report?

Mr. CURTIN. Right. And it is close to what they had 12 years ago.

Mr. ABERCROMBIE. Okay. Now, and as an example of that, you say the task force is charged with developing, coordinating, detailed UAV development plans, recommending priorities for development, procurement efforts providing the services and defense agencies with implementing guidance for common UAV programming.

So, if I understand it correctly is that from a planning purposes for program purposes, for evaluation purposes this seems to be pretty good.

But, it doesn't have the authority.

Again, if I understand you going further down the page, “—while the joint task force and the roadmap—” I won’t go into the detail of the roadmap, because it is essentially programmatic in nature.

“—and are important steps to improve management of the program, they are not enough to provide reasonable assurance that DOD is developing and fielding the UAVs efficiently, the roadmap does not constitute a comprehensive strategic plan for developing and integrating the UAVs into the force structure.”

“Moreover, the joint task force’s authority is generally limited to program review and advice insufficient to enforce program direction.”

So, my understanding of a quick reading of the report is, is that from a programmatic point of view, they are doing pretty good, even the competition part that the chairman was talking about, maybe overall has actually, again, been a pretty good way of going about things.

There have been challenges and meeting those challenges, even though the competition hasn’t necessary led to duplication, although that is a problem that has to be addressed.

But what I take it for then leading this programmatic charge into, in the context of a strategic plan and an organizational capacity to enforce that strategic plan and actually integrating the UAVs into the force structure.

Mr. CURTIN. You have stated it perfectly. That is exactly the issue that we are trying to get at here.

Develop a true strategic plan and then have an office with enough authority to—

Mr. ABERCROMBIE. And that is where the argument comes from, the DOD, on the second recommendation. Right?

So, I wrote down in my notes, “Why?” Why is there an argument? It seems clear enough to me.

Now are they arguing that there is sufficient authority to integrate under a strategic plan that exists somewhere for that? Because if that does exist and there is such authority, I haven’t found it.

Mr. CURTIN. I think the argument, and I think that is a good discussion to have with the next panel, but I think the argument is that the AT&L undersecretary, does have that kind of authority.

Our concern is that there is a limit to how much the undersecretary can get personally involved in some of the kinds of problems that are going to occur and have already occurred here in UAV’s hangar.

They have had to go to that kind of heroic type of effort to involve the undersecretary to force, for example, the J-UCAS program now.

And what you really need is something that can operate at a lower level; below the level of the undersecretary to really make those kinds of things happen.

Mr. ABERCROMBIE. When you say those kinds of things happen, you mean decisions that mean these vehicles, having been approved, having been vetted, have then able to survive congressional oversight with respect to funding and on, are actually going to be put into the force structure and implement it and there, utilization implemented in advancing the seven requirements are.

Right?

Mr. CURTIN. Right. Exactly.

Mr. ABERCROMBIE. Now, does the undersecretary, in your estimation, have that authority. Or could have that authority?

Mr. CURTIN. Probably the undersecretary, with his authority to delegate it from the secretary could make those kinds of calls.

But you don't see that very often. Those are tough calls and—

Mr. ABERCROMBIE. Because that require legislation on our part to see that gets done, because otherwise, you know what you risk is.

Because what you risk is people like Abercrombie and Weldon saying you should do. And people complain about that.

But my attitude on that is, and I have expressed this as chairman, I have expressed publicly before us, don't come and complain to us, if you are standing around waiting to see who is going to say yes, because people like ourselves will go and do it.

If you have a vacuum of actual decisionmaking taking place in the military, you can't complain then if the congressional oversight, part of it starts insisting that something get done.

Mr. CURTIN. Yes. Good point.

I agree.

Mr. ABERCROMBIE. Okay. Thank you.

Mr. WELDON. Thank you, Mr. Abercrombie.

Mr. ABERCROMBIE. It is very disconcerting, Mr. Chairman. The heads have nodded and agreement has been given to my observation.

You will pursue this fine with our second panel on the floor.

Mr. WELDON. Mr. Turner is recognized.

Mr. TURNER. Thank you, Mr. Chairman.

This was a phenomenal demonstration, it certainly gives us an ability to understand how some of the operators might view the information was wonderful. It was wonderful.

I appreciate also the chairman's comments concerning the management of UAV procurement and its development of importance that we not have unified approach to, what may be very similar systems throughout our UAVs that could replicate some of our successes.

In looking at this demonstration and also the number of UAVs and the increase that we have on the battlefield and the use of these, and one question that struck me was the ability of managing the airspace at the different knowledge level that we have of what is out there, what is available and aircraft that are in their space.

And your thoughts about how the coordination is occurring in making certain that by getting a greater unmanned presence on the field that we don't overcomplicate our airspace.

Mr. WELDON. I just thought, yes.

That obviously is becoming a greater concern. I don't think we are aware of anything from that that would be an issue in the battlefield right now.

Our understanding is that that kind of airspace is pretty well protected and managed. I think the issues that, regarding airspace: that will be more important as time goes on.

It will be civilian airspace because there are yet agreements to be worked about how will fly in civilian airspace, regarding being

able to file and fly; crash avoidance, working with the air traffic controllers. And actually getting air crashed certified.

And I think that is a problem that is going to increase as organizations like the Department of Homeland security, and the Coast Guard start operating more UAVs.

But, I am not aware of any military American space, but I am not aware of UAVs issues are they work this time.

Mr. TURNER. I think that is a fair statement. The one comment I would add is that part of that is the reflection of the state of the art in these at this point. Even though there were 10 systems being used in Iraqi Freedom.

For example, they are used in small numbers and in defined area and the de-conflicting and the airspace management has not been a problem.

That is not to say it is something that needs to be looked at in the future, though, as we get more systems and more intense operations.

Thank you, Mr. Chairman.

Mr. WELDON. The gentleman raised an excellent line of questioning and just to follow up on his line of questioning, I would ask GAO, perhaps we can work together on pursuing this even further because I know there has been a lot of interest on our municipal fire department and police departments for UAVs, in fact, New York City has a UAV already.

Now there is a major issue here of both liability and airspace and perhaps you could help us sort through that as there becomes a dual-use focus on UAVs that we are building for the military and intelligence to be deployed domestically, that we should be looking at.

You could help greatly in that area.

Mr. CURTIN. There are some serious issues with Federal Aviation Administration (FAA) certification and all that to fly these in domestic airspace, especially.

Mr. WELDON. Dr. Gingrey is recognized.

That is all. You are getting off easy today. Because you did a great job with the study for us and we haven't had time to fully digest yet, but we will.

But we want to encourage you to continue to work with us because this is an issue that is going to become bigger and bigger for this subcommittee and the full committee as we put more money in.

In fact, the Army, in their reprogramming of the money from the Comanche, as I think, alluded to the fact that they may reprogram up to \$300 million into UAVs.

We want to make sure as that is done, that we are doing it in a methodical way that gives us the best value for the dollar.

There are a lot of good technologies out there, but we want to make sure that we get the best at the cheapest possible cost.

And so, your input has been very valuable to our effort and we appreciate and thank you for coming today.

You are excused, thank you. And we will submit some questions for the record. And you can help us with those, also.

Our second panel is now asked to come to the front. That is simply Dr. Lamartin, who is the director of defense systems OSD.

I believe last year, Doctor, we had one of your subordinates testify, so it is good to have you here this year.

Dr. LAMARTIN. Sir, it is a pleasure to be here.

Mr. WELDON. The floor is yours. You may take whatever time you would like. Your statement is in the record as you wrote it. We would ask you to make whatever comments, but leave time for questioning for the Members.

And you have heard our comments already, relative to response to the reports, so you may want to touch on those, also.

STATEMENT OF DR. GLEN F. LAMARTIN, DIRECTOR, DEFENSE SYSTEMS, OFFICE OF THE SECRETARY OF DEFENSE

Dr. LAMARTIN. Good afternoon, Mr. Chairman, Mr. Abercrombie, Members of the subcommittee.

As you note, and sir, I have submitted my written statement for the record and would like to make a few opening remarks before taking your questions.

I am here this afternoon to describe for you the department's considerable progress in our unmanned aerial vehicle, or UAV programs.

This committee has consistently provided direction and support to our efforts and the development and migration of UAVs for the joint force, many of our UAV-related successes we owe in large part to the unwavering support this committee has provided. And we thank you for that.

In my written statement, you will find a summary of the Department's UAV programs, a description of their contributions to date and our plans for each of them.

I will not take the time to go through that material now. What I will note, however, are the contributions UAVs have made in Operation Iraqi Freedom. UAVs played a major role in the 26-day combat campaign.

As we have noted, more than 10 different UAV systems combat and combat support operations.

This is noteworthy, given that but one UAV system, served in support of Operation Desert Storm in 1991. As we speak today, UAV systems are deployed and engaged in Iraq and Afghanistan.

And as the panel that follows me will point out, they are making valuable contributions everyday.

Taken as a whole, this technology area is one of the best examples of the Department's goal to rapidly transform our military and conduct warfare.

It is characterized by innovation and a healthy industrial base that includes the pliers from the largest of the defense industry contractors, to the smallest of small businesses

OSD is heavily engaged in the management of our UAV programs, providing the guidance necessary to ensure that we acquire UAVs in a coordinated and efficient manner.

The Department's UAV planning task force, under my purview, works to guide the services and their acquisition planning, prioritization, and execution of unmanned air system programs.

We have already mentioned the DOD UAV roadmap. We believe it provides the logical, systematic migration of UAV mission capabilities for the services.

The roadmap identifies our top ten goals and that these goals range from broad, programmatic direction to very specific technology solutions.

I would like to highlight in particular, our progress on two of these goals.

Sir, as you mentioned, our number one goal is to develop an operationally assessed unmanned combat air vehicle capability.

To do so, we have consolidated funding into a defense-wide program element for efficiency and we have established a joint, unmanned combat air system, what we call J-UCAS Office that is leading the department's efforts.

This is an example of where OSD has engaged directly to redirect individual service efforts into a joint activity. The Joint-UCAS program is a joint DARPA, Defense Advanced Research Project Agency, Air Force and Navy effort to demonstrate the potential effectiveness of unmanned combat vehicles.

We will demonstrate air vehicles from two different contractors during an operational assessment beginning in 2007. In 2010, we plan to make an acquisition decision for this new class of unmanned combat air vehicles.

Another one of our goals and our top operational goal is to make it easier to safely fly UAVs in FAA-controlled airspace.

To do so, we are working with the FAA to revise the process currently used to operate UAVs in the national airspace. This will greatly improve flexibility and availability of our UAV systems by making it easier to schedule UAV flights.

We expect the revision to be complete early this summer.

These examples should give you an appreciation for the types of goals we are pursuing for our UAV programs.

The roadmap has been very effective in communicating the department's plan, not only to government organizations, but also to industry, inviting innovation and competition in this dynamic technology area.

Although our goals are challenging, the department is working hard to reach each of them. We are committed to maintaining the roadmap as a relevant and current DOD plan.

Finally, I would like to address our engagement with the services on their UAV activity, which is an expansion of OSD's traditional oversight role.

All of our acquisition activities fit within the department's broader capability-based planning approach that responds to policy aims, considers the warfighter needs carefully, matches systems solutions to those warfighter needs and allocates resources efficiently.

In the area of capability need, we work closely with the joint staff and the new Joint Capabilities Integration and Development System Process for requirements generation.

This capabilities-based process focuses on developing integrated, joint warfighting capability, providing analysis of requirements and solutions across the services.

UAVs will likely play an increasing role in meeting of the capability needs, but in each case, they will have to be integrated with our other, diverse systems, manned and unmanned, to provide effective warfighting solutions.

Our resource allocation system, the planning, programming, budgeting and execution process forged OSD the means to adequately review and enforce UAV program activities across the department.

My boss, the Undersecretary of Defense for Acquisition Technology and Logistics, has sufficient authority as the defense acquisition executive to influence these processes and provide visibility and direction needed to advance UAV capabilities and effectively integrate them into the combatant commander's operational forces.

To help him fulfill this role, the leader of the UAV planning task force and I have a standing meeting with him each week to discuss current events and issues with UAV and unmanned combat air vehicles.

In summary, we believe the Department is making positive progress in developing and fielding UAVs.

The wide array of capabilities offered by UAVs ranges from the very small, hand-held systems, to emerging combat vehicles to large, long-endurance platforms.

Unmanned technology will mature in its capability to support many mission areas and at every echelon of command. As it does, the UAV product area will provide opportunities for industry, from large, aerospace corporations to small businesses of all sorts.

The rapid rate at which industry can advance these capabilities and deliver them to warfighters uniquely positions the United States to adapt to new and emerging threats.

Mr. Chairman, this concludes my remarks. I will entertain any questions you might have.

[The prepared statement of Dr. Lamartin can be found in the Appendix on page 253.]

Mr. WELDON. Thank you, Dr. Lamartin, an excellent statement and I am very encouraged to hear about your weekly meeting. That is a very positive development and it makes me feel a lot better.

And I will tell you why.

Seeing the growth in the UAV budget that is occurring and it will occur in the future, which largely I have supported, my concern is whether or not we, since the technology is developing so rapidly, getting a total handle on that capability and then making it available to the warfighter.

When I was in the theater a few weeks ago with a delegation from this committee and we went to Baghdad and stopped in Tikrit, we were on the ground with General Odierno and his leaders. He has four units within the 4th ID.

And we talked with them about their success in defending the road between Tikrit and Kirkut, which they call the killing highway, where a lot of our attacks have occurred, without hitting other insurgents and it has cost us some lives.

And at that time, they had no UAV and they said, "When we had the UAV it made us feel a lot more comfortable, but we were knew what was over the horizon. We could see what changes were taking place, in terms of movement on the side of the road."

And we came back, one of the key recommendations that we took to the commanding officers of the Army and to General Sanchez while we were there, was the need to deploy as quickly as possible,

available UAVs that in fact, DOD had said would in fact, meet their requirements. And there are a number of them out there.

One of the things that I saw, and perhaps I was wrong in feeling this, but there seemed to be this inter-service rivalry.

"Well, I have developed this one and this is my unit for my branch, and therefore, I don't want to use that one, because how would it look if we are using this service's UAV to meet our mission requirements out in the field."

Is that something that you feel also? And are you comfortable that we are dealing with that?

And are we getting to the point where it doesn't matter which service or who develops a UAV, if it is applicable, if it meets the requirement, we can deploy it and use it for our troops?

Dr. LAMARTIN. I think there is a growing awareness of that and I think you will hear more from the panel that follows me as they learned how to use the systems gained experience and saw the value in them.

We have heard a lot the term, interoperability. What we now are thinking about is interdependence, where one service on the ground or in the air will rely on other services first for essential contributions of support.

And I think that will be the ultimate test.

Many of our unmanned air systems provide intelligence, surveillance and reconnaissance information. That is battle space awareness.

Our aim is to make information available on the battlefield to everyone who needs it, in a timely fashion with the kind of accuracy and the details that each individual consumer needs.

It should not matter where that information comes from and when we talk about net-centric approaches to information exchange in the future, that is what we are talking about.

Mr. WELDON. I have one further question before I turn to my colleagues, who all have questions. And that deals with rotorcraft technology, both manned and unmanned.

We did a hearing last week on the whole rotorcraft industrial base. I am very concerned, and I have been, for the last 17 years about.

Our future in rotorcraft technology, both manned and unmanned, and with the cancellation of the Comanche, it further underscored the possibility of losing those technology advances that were going to be part of the Comanche program.

Now the Army and OSD have committed to come up with a plan to redeploy those \$14.6 billions of dollars into a new technology, including rotorcraft.

But I guess, what I really want to know is what is your opinion of DOD's investing in technology development critical to vertical, tactical UAVs?

And how is it managing development and acquisition of such UAVs?

The vertical, tactical UAVs, which we are not showing here today, but which we are going to hold a hearing on in the future, and we will be demonstrating some of those innovative technologies as well.

Dr. LAMARTIN. Like the rest of the UAV program of work, there is a lot going on, a lot of different people to it.

It ranges from some of the innovative solutions, like what the Army is doing with the Future Combat Systems (FCS), where they are developing a small UAV that would be used, able to operate vertically, and would be used down to the platoon level.

It includes work that DARPA is doing, looking at an unmanned, combat armed rotary craft, to again, take advantage of the ability to not have to rely on an airfield, but to be able to deliver weapons from such a platform.

We can also look at things like Fire Scout, which is an interesting example, because it is a system that went through the development process within the Navy.

Essentially, it was small, rotary craft; a very small helicopter. The Army has recently embraced that as part of its solution to the unmanned air vehicle family for the future combat system.

So, we are operating both through the routine development process advancing technology and we think there is actually quite a bit of work going on in that area.

Mr. WELDON. Mr. Abercrombie.

Mr. ABERCROMBIE. Thank you, Mr. Chairman.

Dr. Lamartin, you are the director, defense systems under the Undersecretary for Acquisition Technology and Logistics. Do I have that correct?

Dr. LAMARTIN. Yes, sir.

Mr. ABERCROMBIE. And the undersecretary is who?

Dr. LAMARTIN. The acting undersecretary is Mr. Michael Wynne.

Mr. ABERCROMBIE. You gave very nice testimony here, but the essential question today is, and I agree with the chairman that I think some changes have been made with respect to finding systems solutions, considering warfighter needs, the kind of things that you cited, including these weekly meetings: all that is progress, but the burden of the second recommendation of the GAO report.

Have you had a chance to see the report by the way?

Dr. LAMARTIN. Sir, I have not seen the final report, although I did see a draft.

Mr. ABERCROMBIE. Okay.

Dr. LAMARTIN. And those comments on the draft report are my comments on behalf of the Department.

Mr. ABERCROMBIE. Okay. Well, if you will allow me to kind of go back and forth with you and trust me to say that this is part of a dialogue, I am not trying to catch you in anything.

For me, the emphasis in your testimony, the 11 pages or so, is a progress in programs and so on, and I agree with all of that, I don't dispute that.

But I don't think that is really the issue, at least the issue that is most important to me in today's hearing is not whether you have made progress in this regard, I will take your word on that and take the testimony as being an accurate reflection of what has transpired since 1998.

And you finished by saying that you believe the present circumstances with the undersecretary being in charge, if you will, will effectively integrate UAVs into combatant commands.

Is that a fair summary?

Dr. LAMARTIN. Yes, sir.

Mr. ABERCROMBIE. Okay. You can do it, and you say that here, but if you go to page 11 of your testimony, you say, "Finally I would like to address our engagement with the services on their UAV activities, which is an expansion of OSD's traditional oversight role."

And you go on to talk about allocating resources efficiently, which I presume means this integrating into the combatant commands.

Dr. LAMARTIN. It is part of the means of integrating into the combatant command.

Mr. ABERCROMBIE. Okay. Allocating your resources efficiently and then you say, "The USDAT&L, the Undersecretary for the Acquisition Technology and Logistics, has sufficient authority as the defense acquisition executive to influence these processes."

I accept that and I think your testimony addresses that, "and to provide the visibility and direction needed to advance UAV capabilities" I accept that, too, "and to effectively integrate them into the combatant commanders operational forces."

That is where I am a little confused as to whether that is actually taking place or going to take place, or whether that authority will be exercised by the undersecretary.

Mr. ABERCROMBIE. The reason I am pursuing this, is not in defense of, but in illumination of that position, you go on to say, "Our resource allocation system, the famous PPB&E" and if you have had some experience as I have had back in the state legislature, it used to be the PPB program, which had some different adjectives associated with it, you might remember.

Dr. LAMARTIN. But much the same process.

Mr. ABERCROMBIE. But I don't want the Federal Communications Center (FCC) coming after me, so I won't say what it is. But execution has been added to it.

That gives the Office of the Secretary of Defense adequate review, again, that was accepted, but enforce these program activities and then you go on to say, "—maintain momentum and direction," again, no argument with that, "but accelerate their development and fielding."

That is where the question is.

I have gone on at some length because you don't have the report right in front of you and I want to be fair about it.

What we are concerned about, and I think I can speak for the chairman and the other Members on this, what we are concerned about is, are you telling us in response to the GAO report that the Undersecretary for Acquisition Technology and Logistics, not only has authority, but is going to exercise the authority to actually integrate these UAVs into the respective armed forces and will be able to make those decisions without having to defer elsewhere in the DOD?

Is that the intention of the Office of the Secretary of Defense?

Dr. LAMARTIN. That is the intention. But as you well know—

Mr. ABERCROMBIE. You need legislative or additional legislative authority to do that, or do you have the power now?

Dr. LAMARTIN. Sir, we do not believe we need additional legislative authority to do that, but we have to recognize that OSD, as the headquarters function, has to work through others.

Our responsibility is to have a vision and articulate it, to identify the right things to do——

Mr. ABERCROMBIE. Yes.

Dr. LAMARTIN [continuing]. To establish the programs to do those things, be they technology development, advanced concept technology developments, which are a wonderful way to put new tools in the hands of the operator and give them experience with how well they might work; to establish formal acquisition programs——

Mr. ABERCROMBIE. Right.

Dr. LAMARTIN [continuing]. Special management structures like the Joint-UCAS program office; procurement strategies and plans; give the services, as our agents, the wherewithal to make this happen. But, perhaps I am tripped up——

Mr. ABERCROMBIE. And?

Dr. LAMARTIN [continuing]. On my own words and that is fair, ultimately, the integration into the forces is a responsibility that the services have, must have——

Mr. ABERCROMBIE. See? That is where our problem comes.

Dr. LAMARTIN [continuing]. And something that we want to create the environment for them to succeed.

Mr. ABERCROMBIE. Okay. Then why fight the GAO on this? Because, I am not speaking for the chairman, but our concern, and this is a joint concern, there is no partisan differences or anything on this, is when do we get to the point where these decisions get made?

Otherwise, honest, you are going to risk having us make the decision for you because you are doing a good job. Maybe you are a victim of your own success.

Of course, you got Admiral Cohen working here and I will cite that, just say you got a joint effort with DARPA and Admiral Cohen makes decisions. I will tell you that.

He never hesitates to make a decision and the responsibility for those decisions rest with him. There is never any confusion where Admiral Cohen is concerned, as to who made the final decision and what the implications of that were for the various elements that he is working with.

Well, yes, I am going to say they are usually right.

But, that is because he is very, very good at asking people to give him all the information. He is not arbitrary.

I suppose you could say he was arbitrary in the end, because you have to make a decision. But he is not capricious about it at all.

He encourages the upward filtration, if you will, of all the information that he can get. And then, "Okay, here is where we are going, here is what we are going to do, here is the timeline, et cetera, et cetera."

Now all we are driving at here is we see this as such an important element in the advancing of our capabilities militarily. And I think you agree with that and you have acted accordingly and you have responded accordingly in the OSD's jurisdiction.

Now we are at a stage where we have to have assurances here before we go on with the funding. This just doesn't become another

one service versus the other service and people jockeying for position and all that.

We expect you to make a decision, maybe not you personally, but the undersecretary, or by acting on behalf of the Secretary of Defense and on behalf of the joint chiefs and so on, make decisions about where the deployment of these vehicles is going to be in the context of a strategic plan that incorporates these elements.

And that has to be done sooner rather than later. We think you are at that stage. I don't think I am overstating the case. And so that is what we want.

The fielding part here and the effective integration in the combatant commanders operational forces is what we need to know at this stage: where that is advancing, where it is going and what the process and mechanism for that part of it is going to be.

Dr. LAMARTIN. Where we disagree with the GAO recommendation, as you have stated so well, is not in where we want to go, but how best to get there.

And we favor centralized planning and decentralized execution that we don't favor a hand's on management of all of the daily decisions of individual——

Mr. ABERCROMBIE. Can you indulge me one minute?

Dr. LAMARTIN [continuing]. Programs, and that is OSD's level.

Mr. ABERCROMBIE. I want to get to the next questions, but excuse me, but Dr. that is not dealing with decentralized, centralized, we are not arguing with that.

The Secretary of Defense may be amazed to hear me say that. I defer to his superior wisdom on virtually anything, but in this instance, I agree.

Having had that wisdom available, which I think is the case now, in decentralized execution that is fine, but it has to be done. Somebody has to issue the order to them.

"You are going to do this, this, this and this and implement it." That is where we don't seem to have the answer yet.

Dr. LAMARTIN. Yes, sir.

Mr. ABERCROMBIE. Do I take that slight nod to mean silence is assent?

Dr. LAMARTIN. Sir, I am not going to argue with that.

Mr. ABERCROMBIE. Okay. You are taking the Thomas Moore approach, thank you very much.

Mr. WELDON. We are going to see if one of these UAVs can drop Macadamia nuts on the heads of people who don't agree with you.

With that I will turn to our next witness, Mr. Akin.

Mr. AKIN. Thank you, Mr. Chairman.

In your opening statement, you mentioned DARPA's joint unmanned combat air system, was that JUCAS? Or something?

Dr. LAMARTIN. J-UCAS, sir.

Mr. AKIN. J-UCAS. I support the joint effort because of the positive aspects of the program will bring to the Air Force and the Navy.

I was also pleased to hear that the operational assessment is planned to begin in 2007. I would have thought that the redirecting of individual service efforts into a joint program could have possibly set the timeline back some in the process of trying to put that all together.

First of all, are you confident that DARPA will keep the program on track and keep the goal of delivering vehicles for operational assessment in 2007? My first question.

Dr. LAMARTIN. Direct answer is yes, sir. The director for DARPA, he works for the Undersecretary of Defense, Acquisition, Technology and Logistics as well.

We have established an executive committee that is meeting quarterly to review the planning as we stand up that program of work. And we will be watching that progress very closely.

And I am pleased to report that one of those UCAV prototype systems, the X-45, flew last week. It is scheduled to fly again today and again later this week.

So, we are very sensitive to not disrupting the progress, the ongoing progress in that area.

Mr. AKIN. And also you said that the joint system is based on a common, open architecture and operating system. Could you expand on that?

Dr. LAMARTIN. Sir, that has to do with how we collect information, how we exchange information, how we do the command and control.

What we want to do is, as best we can, seek commonality in sensors and payloads, command and control systems and allow flexibility perhaps in the platform, rather than in the way we use that platform.

Mr. AKIN. Flexibility in the use of the platform?

Dr. LAMARTIN. Flexibility in the design of the individual platforms.

For example, if it is designed for carrier operations, take off and landing, as opposed to take off and landing from a runway.

Mr. AKIN. Okay. But in terms of you are looking for one, sort of, operational software, or systems architecture so that you can vary the vehicle somewhat and get—

Dr. LAMARTIN. Allow the vehicles to vary somewhat. And yet we are trying—

Mr. AKIN. Give them the actual communication processes, is on language they all understand.

Dr. LAMARTIN. Yes, sir.

Mr. AKIN. Thank you very much.

Thank you, Mr. Chairman.

Mr. WELDON. Thank you, Mr. Akin.

Dr. Lamartin, I want to thank you for your work and for coming.

We have some other questions for the record, but in the interests of not keeping our third panel waiting, we would like to get them up and give them a chance to respond.

But we appreciate your leadership; we will continue to work with you in a very positive way and helping you to oversee this very vital part of our defense systems for the 21st century.

Dr. LAMARTIN. Sir, thank you and I thank the committee for its continued support.

Mr. WELDON. As our third panel is coming up, I would just announce to the services that are here, at the end of this panel, I would like to have each of the services to have someone come forward and hold up and point to our four static displays that we have here and explain a little bit about them.

And so I would ask the Army to be prepared to discuss the Raven, the Air Force to be prepared to discuss Desert Hawk; the Marine Corps to be prepared to discuss Dragon Eye; and the Navy to be prepared to discuss the Silver Fox, whether it is a uniformed person or someone from one of the labs, whatever; if you could just come up.

And at the end, after we have done this round, we would like to have them just hold up so that the Members and the staff can see what we have in the way of a static display.

Our next panel consists of Major General James Thurman, Director of Army Aviation Task Force and Lieutenant General Walter Buchanan III, Commander of Central Command Air Forces and Commander of the 9th Air Force, United States Air Force.

Gentlemen, your statements are accepted as a part of the record. You may make and proceed to make any comments you would like to make verbally and then we will proceed to questioning.

We would like to thank you for being here and we will turn the floor over to you, General, for whatever comments you would like to make.

STATEMENT OF LT. GEN. WALTER E. BUCHANAN III, COMMANDER, UNITED STATES CENTRAL COMMAND AIR FORCES AND COMMANDER, NINTH AIR FORCE, UNITED STATES AIR FORCE

General BUCHANAN. Thank you, sir.

Chairman Weldon, distinguished Members of the subcommittee, thank you for inviting me to provide a warfighter's viewpoint on the use of unmanned aerial vehicles in support of military operations in Afghanistan and Iraq and to respond to your questions.

First, if I may, sir, on behalf of the men and women of U.S. Air Forces, U.S. Central Command, (CENTAF), I would like to express our appreciation to the committee for your unwavering support to the warfighter.

Your efforts harden our resolve under difficult circumstances and we appreciate your service to the nation.

I am also pleased to be able to report to you the success of the dedicated warriors of CENTAF are achieving on a daily basis. Our Nation's airmen, of all services, performed magnificently during major combat operations in both Operation Enduring Freedom (OEF) and OIF.

They are now fully engaged in building a foundation that will provide regional stability for the future. It is a difficult challenge, but one that we are fully committed to.

As the CENTAF commander and General Abizaid and the U.S. Central Command (CENTCOM) commanders, Combined Forces Air Component (CFAC), I am intimately familiar with the contributions and limitations of my UAV force in support of our operations in Afghanistan and Iraq.

Yet, as we speak, UAVs are loitering over hostile territory gathering intelligence and tracking targets in support of our ground forces and operations in Iraq and Afghanistan.

From my early days as the last joint task force, Southwest Asia commander, and General Moseley's deputy in the Middle East, I

have seen a significant evolution in the employment of our operational UAV force.

As a pilot who has flown with UAVs as part of his package, and a commander who has employed UAVs in combat, I have seen our UAV force evolve from one that was principally an intelligence collections platform in Bosnia, to one that today, has a very potent air-to-ground capability and represents a truly flexible combat platform and is clearly my bravest wingman.

Doctrinally, CENTCOM employs UAVs in a layered approach, with shorter range tactical systems, assigned to, and direct support of deployed units, while more flexible, longer range systems are used to range the battlefield in general support, responding to set and emerging priorities established by CENTCOM and supported commanders.

Tactical UAVs are not under my control as the CFAC and senior air commander, as such, I will focus my remarks on principally discuss the RQ-/MQ-1 Predator.

Historically, from 1995 to 2001 the Predator was employed solely as an intelligence, surveillance and reconnaissance aspect. Since then, we have made enormous strides transforming the Predator into a true, counter land weapons system, capable of affecting the entire battle space.

The Predator can execute and switch quickly among any role within the fine, fixed, track target, engage and assess kill chain. Its long endurance allows me to combine several of these mission capabilities within a single sortie.

Currently we are employing Predators across the theater in the following roles: official Intelligence, Surveillance, Reconnaissance (ISR), high-value targeting, interdiction, close-air support, force protection, counter-mortar, counter-man-portable air defense (MANPAD) suppression, combat search and rescue, SOF infiltration-exfiltration and battle damage assessment.

Further, we continue to leverage our Predator fleet in an effort to better support our forces in Iraq and Afghanistan.

I recently moved our Predator operations in Iraq from Tallil Air Base, Iraq in the south, north to Belad Air Base where they are now closer and more responsive to current operating locations.

This move has reduced transit time to the target area, thereby increasing their on-station time and also allowing us to leverage the line of sight capability with the launch and recovery unit I have at Belad, to fly shorter line of sight (LOS) missions in addition to the remote split operations we are currently flying via satellite from Nellis Air Force Base.

We continue to look for better ways to employ the Predator in support of the ground force and coalition soldiers. We are using the receive-only video enhanced receiver for rover systems in theater to truly exploit overhead sensors by streaming Predator and other's video directly to supported ground units.

We currently have every available system in theater and have firm order to double this capability as soon as possible.

As the CFAC, I am bringing every asset I have to bear in the daily fight going on at ground level. The long dwell effectiveness of UAVs as surveillance systems is unmatched and it being used to great effect in both theaters.

However, there are many other airframes and systems we are employing to provide additional support to the ground commander.

Despite being designed to target laser-guided bombs in both Afghanistan and Iraq today, we are employing the lightning targeting pods on fighter aircraft and A-10's to provide high resolution video of ground targets, allowing us to use these airframes in non-traditional ISR roles for increased coverage of the battlefield.

To counter the insurgent threat in both theaters, we have tracked and mapped out many of the vulnerable main supply routes, pipelines and power lines and daily task our crews and UAVs to survey them for suspicious activity.

If we see any, we then take a closer look and coordinate with the ground force commander and many times preventing another improvised explosive device (IED) from injuring coalition forces.

We have also noted blackmarketeers salvaging copper from newly repaired power lines. We work with local ground commanders to police these individuals as well.

While these do not represent traditional uses of these platforms, it has been effective and that is all that matters to you and I.

As the air commander, my primary concern is the effect that air power has on the battlefield in support of CENTCOM's mission and our ground force.

If I can achieve a particular effect with F-16s and lightning pods, then I will task them, if a Predator UAV is the appropriate vehicle, I will task it.

My bottom line is to create an effect on the battlefield that supports my fellow warfighters and their mission and keeps our coalition forces safe.

Over the past 2 years, I have walked the ground in both Iraq and Afghanistan and I cannot tell you how proud I am to serve alongside the wonderful men and women that make up our armed forces.

From the son of my own in uniform, trained and ready to deploy, there is nothing I will not do to ensure our forces have the support they need to combat the insurgent threat we face on a daily base.

Chairman Weldon, distinguished members, I am honored to be your CENTAF commander and truly appreciate the support this committee has provided the years to our men and women in uniform.

I look forward to an opportunity to host you in theater or at Nellis Air Force Base, to allow you a first hand look at our Predator UAV force in action.

Thank you for the distinct privilege of being with you today. I look forward to your questions and working with you as we continue to refine our UAV force.

[The prepared statement of General Buchanan can be found in the Appendix on page 289.]

Mr. WELDON. Thank you, General.

General, the floor is yours.

STATEMENT OF MAJ. GEN. JAMES D. THURMAN, DIRECTOR, ARMY AVIATION TASK FORCE, UNITED STATES ARMY

General THURMAN. Chairman Weldon, Ranking Member Abercrombie and distinguished Members of the subcommittee, I am

pleased to be here again today to discuss the Army's progress in our unmanned aerial vehicle, or UAV programs.

I welcome this opportunity to testify before you today and appreciate the continued and ongoing support and guidance of this committee as the Army's UAVs mature and expand their role in enabling the joint force.

As the recent Iraqi freedom operations officer for the combined forces land component commander (CFLCC) for the decisive combat phase, I can testify on the Army's recent UAV experience.

I am also pleased to be here with Lieutenant General Buchanan, the CFAC and CENTAF commander who I had an opportunity a year ago about this time to be working that operation in the Iraqi theater of operations.

Since the start of sustained combat operations for Operation Iraqi Freedom one year ago this week, the Army's UAV capabilities have expanded significantly.

Although it was limited at the outset of ground combat operations, Army UAV capability in the theater has improved and will continue to do so particularly over the next several months and throughout the year.

The lessons learned from the onset of our operations and the daily jet challenges our troops face indicate that UAVs are critical to both force protection and enhancing situational awareness and intelligence gathering.

The focus of this statement I provided for record today is on the Army's experience with UAVs in recent combat operations.

I will address the capabilities these systems afford our troops at varying echelons of command, describe the challenges we have encountered along the way, and discuss our plans for the future force.

There is no doubt that our recent and ongoing operations in Afghanistan and in Iraq, coupled with our continuing need to defend our homeland from terrorists will drive the development of both air and ground, unmanned platforms to such an extent, that they will become increasingly more important.

Permanent fixtures in our armed forces, as we see for the future, from what we have seen with the recent wanted growth of UAV capabilities.

These systems are certainly coming of age and have great potential on the battlefield now and into the future. I would like to highlight the increase in UAV capabilities in support of current operations.

At the start of combat operations in Iraq, our Army forces had insufficient numbers of UAVs. Only a single hunter UAV system of eight aerial vehicles is what we had initially in country that provided the 5th Corps commander, Lieutenant General Scott Wallace, a solitary continuous eye in the sky.

I might add, we made up for that shortfall with the other joint platforms with close management of all those ISR assets. And I can think of no opportunity where we didn't get a critical area not covered with what the CFAC provided us.

The arrival of the 4th Infantry Division brought in the first, tactical UAV system directly into combat. Let me give you an example of how effective your investments have been.

Major General Odierno, who you spoke of earlier, the Commanding General of the 4th Infantry Division stated: "The tactical UAV has become an absolute horror for my brigade combat team commanders and located, identifying and ultimately defeating high-value targets in their brigade area of operations.

This system is flexible, durable and is a timely tool that supports the conduct of tactical raids down to the company level; the enhancement of force protection and the identification and mitigation of potential terrorist strikes against coalition forces.

The tactical UAV was employed in raids outside of Tikrit that snared millions of dollars in contra-band; contra-band, cash and weapons along with loyalists to dispose Iraqi President Saddam Hussein.

No casualties resulted from the raids where we have been able to incorporate UAVs. The mission success depended in part of having the tactical UAV loitering overhead.

For example, we had an individual that tried to get away by foot and got into a car. We tracked him and stopped him at a check-point.

So, there the technology works very well when it is planned as an overall combined-arms operation.

With your assistance, the United States Army has expanded its UAV capabilities and now has 300 units and eight shadow units fielded, with 12 more planned this year.

We are also providing our deployed forces the added capability of the Raven, the small UAV to fulfill an urgent war-time requirement for enhanced force protection and situational awareness.

A rapid equipping story success I might add. The Raven has become the small UAV of choice for the U.S. Air Force and the Special Operations Command and now the U.S. Army.

The Raven has been operational in Afghanistan for nearly six months. We currently have 10 systems in Afghanistan and that is 30 air vehicles.

And from early reports, they are providing life-saving situational awareness for those soldiers that are operating at the tip of the spear.

The Army will field a total of 185 systems total on Raven this year alone. And as I have said, we have fielded a total of 10 to Afghanistan.

Additionally, the Army is preparing to deploy the improved I-Net, a downsized Predator-A, provided to the Army through a congressional plus-up, to augment our reconnaissance, surveillance and target acquisition capability in theater.

In closing, our common goal is to provide the best possible capability for our soldiers who are in harm's way. I know that you will agree with me that these young men and women deserve nothing less.

In many ways, UAVs are still in their infancy and development. These systems represent tremendous potential and almost limitless possibilities for the future.

Feedback from all echelons of command, from platoon to combatant commanders is that they tell that UAVs have tremendous utility on the battlefield and are key to the success.

We could not have made these gains without your support.

Our goal is to invest in these systems in an educated, physically smart and capabilities-based approach, in order to quickly utilize their potential application in military operations.

On our soldiers's behalf, I sincerely appreciate your interest and involvement in this area. Thank you for your resolute support and to equipping our greatest assets; and that is America's sons and daughters: our soldiers.

I look forward, Mr. Chairman, to answering any of your questions you may have today and that concludes my remarks.

[The prepared statement of General Thurman can be found in the Appendix on page 265.]

Mr. WELDON. Thank you very much. Thank you both for appearing today and for your service to the country.

As you both mentioned, all of us are extremely proud of the brave, young Americans that are today in harm's way and all of us, not just support them, because they are wearing the uniform, but all of us have personal attachments.

Chairman Hunter's son is currently deployed in theater; I have two nephews in and out of the theater.

I could go around this committee and Mr. Wilson has a couple of sons and all of us have personal ties to make sure that we are doing the job of protecting these troops and giving them the best equipment that America can provide.

And you mentioned my reference to General Odierno, when we met with him for two days, in the thick of things, up in northern Iraq, above Baghdad and our concern was, and General you have expressed here today that we are addressing any shortfall that exists with operational tactical UAVs, which at the time we were there, they did not have one operating, but they had had one the week before.

And we are very pleased with its effort. And it is because it is a personal issue for each of us; we have lost a number of soldiers.

I remember General Odierno telling me about his casualties; telling me about this one 24-year-old lieutenant who was leading a group on the road between Tikrit and Kirkuk, when they were attacked by Al Qaida and other operatives and he came under fire and did his duty, as any lieutenant would and kept defending his troops and eventually, he was brought down. He was killed.

And as coincidence would have it, I nominated that young man into West Point and he went through West Point with General Odierno's son.

And I was carrying a letter from Lieutenant Bernstein's, who this young man was, parents that they had sent to me, a three-page letter documenting the bravery of their son and how proud they were that their son served his country and died what he had loved doing best: serving his Nation and serving in the Army.

And I can tell you there is no difference among anybody on this committee: we will give the military whatever it needs to protect the lives of America's sons and daughters in harm's way today.

And when we came with this message and it has been repeated in private sessions and public hearings, tell us what additional money you need, what additional support you need to make sure that we have maximum protection for our troops, both on the use

of UAVs, which they feel are so vital, as you have pointed out, as well as for the technology; we are trying to deploy quickly.

So help us deal with these improvised remote-activated devices that are causing so many of our losses and casualties.

And so, I just want to reaffirm that the committee, working with the appropriators, are prepared to give you whatever additional resources that you need to put them out into the hands of people like Odierno and his other colleagues.

Not next week, not next year, but right now and we will continue to provide that support and so will the American people.

General, I just have one question for you, that you are flying. You have the wings on your uniform and you obviously have significant experience and you listen to where the future of UAVs are going in America and when you talk about the small, tactical UAVs and the large UAVs, I think it was Senator Warner, who said that perhaps, 20 years from now, we will see UAVs pick up a major part of the function of what our current fighter planes and our other aircraft are doing in the Air Force.

There is some resistance within the services, I would think, from the enhance use of UAVs. You have to take and perform so many missions, the number of which you outlined today that are currently being undertaken by these UAVs.

We in the Congress have big problems this year and big problems in our out years in funding three new tactical fighters: the Joint Strike fighter (JSF), the F/A-18 E and F and the F/A-22.

Now I am not saying or suggesting that UAVs can replace those, but certainly the Congress is very much interested in what role larger UAVs can and should play and giving us the proper support in the future, so that maybe we can redirect resources from manned aircraft into these unmanned aircraft, into other quality of life needs and other cutting-edge technology needs that our services have.

What is your outlook? Is the UAV going to revolutionize aviation and the military or is it simply a passing fancy that will not be able to provide that strong support that many think it will in the next 20 to 30 years.

As an aviator, tell us what your own feelings are.

General BUCHANAN. Well, sir, first thing I would have to admit, that as a pilot, for a long time, those in my profession kind of looked at the UAVs as scants.

But, I can tell you when I first got into theater almost two years ago and there would be a mission brief, we always would talk about the fact, "Okay, the Predator is going to be flying on this side of Iraq, we are all going to fly on this side of Iraq."

I can honestly tell you that by the time we got ready for OIF, we had come a tremendous way where the Predator crews had been included as part of the mission brief. I was able to show fighter pilots that they can talk to the Predator.

Now, I would admit to you at the time, that the pilot was many, many miles away, but you could still talk to it and he was, quite honestly, a very valued member of the mission package, and quite honestly, his bravest wingman.

I can remember a particular evening where I actually took a Suppression of Enemy Air Defenses (SEAD) asset, F-16s and EA-6Bs and I put them in a position to protect an MQ-1.

And I would tell you that was a telling moment for a lot of people that I knew around me at that moment, because we were taking manned aircraft to protect an unmanned.

And it wasn't manned or unmanned, it was a mission capability that the warfighter needed and that particular night, the capability was on the MQ-1. Now the same thing applies to something like the Global Hawk.

At the same time, the reverse is also true. We were in OIF; we used UAVs the first night to go ahead and they went in to help break down the door to go ahead and bring in manned systems.

So, I don't think really it is an answer of either/or, it truly is an integration of the right place to put the mission-capability.

We do have limitations with UAVs, by virtue of size and other things. The Predator, as much as I love it, it does have some limitations.

It is a little slow, it doesn't like bad weather, but beyond that, it is a tremendously flexible and capable system.

I would tell you it is not a passing fancy. I think UAVs are here to stay. And I think what you and I are going to see in the future is more of what we have seen over the last two years.

You may recall that two years ago, you and I were only flying UAVs within line of sight and then within that first year we began to fly them via satellite link.

And today, all of the Predators that I fly in Iraq, I am flying from Nellis Air Force Base, which allows me to range those airplanes further and actually shift them between theater, which takes me to Congressman Abercrombie's comment about combatant commanders.

Because in CENTCOM, we have the flexibility because of the technology that you have provided us to be able to one day fly that airplane from Nellis Air Force Base in Iraq and the next day in Afghanistan, as we go through.

And all I have to have is a launcher recovery base somewhere close by to get them within. So, sir, I think they are here to stay. I don't think they are going to replace manned.

There are some missions I think, where you need the man in the loop in the aircraft. At the same time, I think we are going to see more and more integration, in the future.

Mr. WELDON. Thank you, General.

Mr. Abercrombie.

Mr. ABERCROMBIE. Thank you very much, Mr. Chairman.

Let me go to it, but General Thurman first. Most of your testimony, starting on page two, where it concerns what you call the "areas we see for improvement."

And I think most of your testimony then relates to what you have experienced so far and then things that you think are being done, including doctrine, which I appreciate. I think that is very, very important.

And the experience that you have had, if you go to page 16, 17 and 19: explication of that: for example, the changes in systems that might take place.

And you cite, for example, intelligence surveillance and reconnaissance, ISR; you talk about the alternative systems that you are working with there to try and see which is the best, and the communications relay package, the CRP package, exploring the various options there.

All that is well and good and all of that I think you will find support for from this committee, this subcommittee and from the committee as a whole. Certainly from the chairman; I am sure of that.

But then when we get down to the end, that is where my problem comes in and the questions that were raised are the observations made in the GAO report.

And I take it both of you have not had a chance to go through this report exactly yet? But you have heard the discussion to this point.

You make a good point and I appreciate it where you say, "For the Army recently," this is on page 20, "the Army recently made several decisions about our organizations and propensity," and you say, "the acquisition of the Army UV systems has been centralized at Huntsville, Alabama, within the aviation program executive office."

Well, what is the relationship, if you know of the aviation program executive office to the Undersecretary of Defense for Acquisition, Technology and Logistics?

Is there a direct connection there? Or a direct reporting connection? I am not familiar with the organizational chart.

General THURMAN. Congressman Abercrombie, as you may or may not know Mr. Bolton, who is our Army acquisition executive, reports right to Mr. Wynne.

Mr. ABERCROMBIE. Reports directly.

General THURMAN. He does.

Well, he reports to the Secretary of the Army, but we work very close with OSD, obviously on through the Joint Capabilities Integration and Development System (JCIDS) process, as we come up for requirements.

What we have tried to do is consolidate, particularly in UAVs under the PEO Aviation down at Huntsville, Alabama, so we have all that in one place, that when we come up with a requirement, that they look at that in detail and as they develop technologies, then that is put in the joint acquisition process.

Mr. ABERCROMBIE. General Buchanan, is there an equivalent situation in the Air Force the equivalent of what General Thurman was talking about the acquisition? Let me make sure I got it exact—

General BUCHANAN. Sir, I would be—

Mr. ABERCROMBIE [continuing]. Aviation program executive officer, something of that nature, where you are concerned, in relation to the Undersecretary of Defense for AT&L?

General BUCHANAN. Sir, I am going to have to check. I am just an operator and I am not in acquisition, but I will take that for the record and check with you to make sure.

Mr. ABERCROMBIE. Can anybody help you? Around you?

General BUCHANAN. Sir, to my knowledge, there is no specific office.

Mr. ABERCROMBIE. Okay. Then let me ask you then.

What is the equivalent then, or how do you make that decision, because I am going to take it that I have it from the Army now, representing the Army and the Marine Corps in this instance, right?

General THURMAN. I am speaking, sir, for the Army and how we generate requirements and acquire through the joint capabilities, requirements process that is resident within OSD

Mr. ABERCROMBIE. I thought you mentioned the Army, Marine Corps board, joint capabilities integration. Is that connected then to the—

General THURMAN. Yes, sir. They participate with us in a board as we look at—

Mr. ABERCROMBIE. Okay. You get where I am going with this.

What I want to know is at the point that you accomplish everything toward the conclusion that you have here, "Our goal is to ensure our ground forces have all the support they need to safely execute their mission." And then you cite all of the different activities: the IRS role, et cetera, right?

That guy just cited in the previous testimony.

General THURMAN. Yes, sir.

Mr. ABERCROMBIE. MSRs, the main supply routes, vulnerabilities, et cetera. Those kinds of things.

So let's assume that you are satisfied that this has been done. The Army is satisfied that these things have been done.

The question we have is at what point then, or where does the buck stop, in terms of making the decision so that you actually implement, field, make decisions as to who is going to do what.

Who has that authority? But at least, what I am to gather, the Undersecretary for Acquisition, Technology and Logistics has the authority to make that decision.

But, it is still not clear to me that that is going to take place, or is in the process of taking place right now.

General BUCHANAN. Sir, the head of acquisition in the Air Force has that responsibility, but I would also tell you that within the Air Force—

Mr. ABERCROMBIE. Who he reports, or she reports to the Secretary of the Air Force.

General BUCHANAN. Yes, sir.

Mr. ABERCROMBIE. Not to the Undersecretary?

General BUCHANAN. That is correct.

Again, we also have what we call Task Force Arnold, which was a name that was coined by the Chief and the Secretary of the Air Force that is overseeing the development of our UAVs and that, quite honestly, is chaired by Secretary Roach and General Jumper in the Air Force.

Mr. ABERCROMBIE. Okay. Well, that shows the importance of it for sure.

All I am trying to get at and again, I am not trying to catch anybody or badger anybody, but I really honestly believe that we have to get some definitive testimony or conclusion, with respect to the second recommendation in the GAO report, regarding the actual decisionmaking.

Who has the decisionmaking power, authority and willingness to make decisions for deployments, fielding, et cetera, so that we can make the right authorization and appropriation decisions?

Perhaps you could answer that for the record, if you don't feel comfortable doing that.

General BUCHANAN. Yes, sir, I would be happy to do that.

Mr. ABERCROMBIE. That is essentially it for me, Mr. Chairman. I am very appreciative.

You see, you are in the interesting position that doesn't happen a lot in here. We have actually come to some conclusions. No, really.

Because so much of what happens in here is that everybody is still in the process. And as long as everybody is still in the process, you never really have to make a decision.

In the end, it is, "Okay. Who is going to do what? When do we get the delivery and how does it work?"

Who is going to take responsibility for it and come do it?

But it seems to me that the UAV thing has proceeded so, I don't want to say rapidly, but it really is.

And the changes that you have outlined, and both of you, for that is to say, both of your services and cooperation with Admiral Holand and others, have really moved this along.

The private corporations that you have contracted with; the combination of testing; and innovation on the move, if you will, has been excellent.

And so, we are at that stage now where we are going to say, okay, what are we actually going to do now? Because those are heavyweight decisions that really impact doctrine. Right, General Thurman?

You spent a good portion of your testimony essentially talking about what are the doctrinal implications of this, in terms of what the Army does on the ground?

And the support citations that you make, particularly in your conclusion, which is very well written, by the way, General, the conclusion is a really good summary. That is where we are at right now.

We have to make decision in recommendations and we are not quite sure who is actually doing it. At least, I am not.

And we are not quite sure how soon it is going to be done and whether we have to do it in this budget cycle, this budget recommendation.

And the chairman, I can assure you, is the kind of person in the vacuum; he will fill it in a second.

General BUCHANAN. Congressman, if I may, I can tell you and assure you that in the theater at the dusty boot level, the cooperation and the coordination that goes on between all the services is something to be very, very proud of.

I would tell you that the UAVs that I orchestrate and fly out of Belad, that I order and task out of my headquarters in Qatar, I do so in direct response to the many different task forces and the priorities are what General Abizaid gives me.

But you alluded to one of the problems that General Thurman and I both have is that as we are fielding this new technology, we

are learning more and more everyday on ways we can use this system.

And as I mentioned, two years ago, the Predator was strictly an ISR platform. And there are intel officers out there today that would like to keep it an ISR platform.

At the same time, there are special operations and conventional ground forces that know very well how we can use it for long-dwell stare on high-value targets, MSRs and for other different reasons. And there is a natural tension.

But it is a tremendous technology and it serves as a working unit to make it all happen.

Mr. ABERCROMBIE. Thanks very much.

Mr. WELDON. I would ask each of you, if you could for the record to summarize for us the process that is used to bring that feedback from the use of the UAVs to you and how that feedback then goes into the designers and the producers of UAVs, so that we can better improve the next generation of UAVs.

There must be a formal process that you have in place to get that feedback coming out of the field and help us understand what that is, if you can for the record.

General BUCHANAN. Yes, sir, I would like to offer something on that, if I could.

One of the things that we are doing right now, that as we looked at the development of UAVs, and are particularly trying to get it doctrine, tactics, techniques and procedures, the Army G3, General Cody, has ordered an assessment team to go into Iraq and Afghanistan and that is going to have materiel developers and organization and folks that are responsible for doctrine to go out and pull these lessons learned so we can get at that and then start feeding that back in in a more formal process.

And we have had several lessons learned, task forces develop that and we are getting great information. But that is one of the things that is an ongoing effort right now.

Mr. WELDON. We had General Cody in several weeks ago and he gave us a classified brief on that.

And that is the kind of information we just want to be made aware of so that we can continue to help you in those changes that you feel need to be made.

Let me just say before we close the hearing, I would to ask each of the services if they can, to just give us a brief overview.

Someone from the Army could talk about the Raven, if someone here feels competent to do that? Who is our Raven expert?

Point it out to us and hold it up.

(CHART)

Mr. WELDON. Very good.

Neil, do you have any questions?

Thank you all. This has been very helpful to see some of the work we are doing.

This is by no stretch all of the UAV work that is being done and we are going to show some rotorcraft UAV at a future hearing and talk about that specifically.

But we want to thank all of our witnesses and all of our presenters and the services for bringing in these display models.

And General and General we want to thank you for your outstanding service to the country and we appreciate your response to our written questions in the record. Thank you.

This hearing now stands adjourned.

[Whereupon, at 3:56 p.m., the subcommittee was adjourned.]

A P P E N D I X

MARCH 17, 2004

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

MARCH 17, 2004

**Statement of the Honorable Curt Weldon
Chairman, Subcommittee on Tactical Air and Land
Forces**

**Department of Defense Unmanned Combat Air Vehicle
(UCAV)
And
Unmanned Aerial Vehicle (UAV)
Programs**

March 17, 2004

The hearing will come to order.

Prior to beginning these proceedings, I want to pause to acknowledge the valiant men and women in our armed forces, coalition forces, and civilian personnel who are leading the fight against global terrorism. Recent events in Spain only serve to emphasize the pervasive nature of this problem. We extend our condolences to the families and loved ones of those who have been injured or have given the ultimate sacrifice fighting to defend the fundamental freedoms on which our nation was founded. Our

prayers are with those in harm's way around the globe, and we hope for their safe return.

This afternoon the Tactical Air and Land Forces Subcommittee is meeting to receive testimony on the Department of Defense's (DOD) unmanned aerial vehicle (UAV) programs. I would like to welcome:

(1) Our first panel members from the General Accounting Office (GAO): Mr. Neal Curtin, Director, Defense Capabilities and Management, and Mr. Paul Francis, Director, Acquisition and Sourcing Management.

(2) Our second panel member is Dr. Glen Lamartin, Director, Defense Systems, Office of the Secretary of Defense (OSD); and

(3) Our third panel members: Lieutenant General Walter E. Buchanan III, Commander, Central Command Air Forces and

Commander, 9th Air Force, and Major General James D. Thurman, Director, Army Aviation Task Force.

Mr. Curtin and Mr. Francis will present testimony based on their extensive work on the subject of UAV programs and will contribute both a historical perspective and discuss their recent findings.

Following their testimony, Dr. Lamartin will present the DOD perspective on UAV acquisition, including the DOD UAV Roadmap to the future.

And to complete the picture, General Buchanan and General Thurmond will provide the warfighter perspective on the use of UAV's, both in combat and post-combat operations.

You will notice that we have a static display of operational small UAV's from each of the services that will be available for examination following the hearing.

I have, since the mid-90's when I was Chairman of the Research and Development Subcommittee, advocated an aggressive fielding of UAV's. Recent conflicts have demonstrated their utility, and today, UAV's are an integral part of our intelligence and military operations. Though UAV's continue to prove themselves daily, the cultural opposition within the services has not been overcome. Nor has the resistance to one Service adopting a UAV developed by another service.

I continue to be concerned that though OSD and the services have developed a UAV acquisition roadmap, compliance is not mandatory, and services are free to do as they wish. OSD, after having gone to all the effort to jointly develop a logical UAV acquisition roadmap with the Services, should have a mechanism

to ensure that UAV acquisitions within the Department conform to that roadmap.

Though small UAV's cost comparatively little individually, in aggregate the cost is very significant as we seek to procure hundreds, perhaps thousands. There should be a competitive selection of each class of UAV, from high-altitude endurance to small man-portable UAV's. Only in this way will the warfighter get the most capability while the taxpayer gets the best price. I am pleased to hear of the recent decision that the Navy intends to competitively select a system to meet its broad area maritime surveillance requirements.

The joint unmanned combat air system is another area of concern. The schedule and missions are still unclear. In addition the program has now been moved again, this time to DARPA. It is not clear to me that DARPA is the preferred location rather than have a military service execute development and acquisition. I am

very interested to hear the various witnesses' comments on this program.

Before we get started, the last point I want to make is that UAV's are sensor platforms, and if the sensor information does not get to the users, UAV's have little value. Standards resulting in interoperable systems are the key to successful UAV operation. Any place where a system can be standardized such as by using a common link, such as the Tactical Common Data Link (TCDL) builds in inherent interoperability. Joint service use of a common UAV offers the same advantages.

GAO**Testimony**

Before the Subcommittee on Tactical Air
and Land Forces, Committee on Armed
Services, House of Representatives

For Release on Delivery
Expected at 2:00 p.m. EST
Wednesday, March 17, 2004

**UNMANNED AERIAL
VEHICLES****Major Management Issues
Facing DOD's Development
and Fielding Efforts**

Statement of Statement of Neal P. Curtin, Director
Defense Capabilities and Management

and

Paul L. Francis, Director
Acquisition and Sourcing Management



March 2004

GAO
Accountability Integrity Reliability
Highlights

Highlights of GAO-04-530T, testimony before the Subcommittee on Tactical Air and Land Forces, House Committee on Armed Services

Why GAO Did This Study

The current generation of unmanned aerial vehicles (UAVs) has been under development since the 1980s. UAVs were used in Afghanistan and Iraq in 2002 and 2003 to observe, track, target, and strike enemy forces. These successes have heightened interest in UAVs within the Department of Defense (DOD). Congress has been particularly interested in DOD's approach to managing the growing number of UAV programs.

GAO was asked to summarize (1) the results of its most current report on DOD's approach to developing and fielding UAVs¹ and the extent to which the approach provides reasonable assurance that its investment will lead to effective integration of UAVs into the force structure, and (2) the major management issues GAO has identified in prior reports on UAV research and development.

What GAO Recommends

In our most recent report, GAO recommends that DOD (1) establish a strategic plan to guide UAV development and fielding and (2) designate the UAV Task Force or other appropriate body to oversee the plan's implementation, ensuring sufficient authority is provided.

¹ U.S. General Accounting Office, *Force Structure: Improved Strategic Planning Can Enhance DOD's Unmanned Aerial Vehicles Efforts*, GAO-04-342 (Washington, D.C.: Mar. 17, 2004).

www.gao.gov/cgi-bin/getrpt?GAO-04-530T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Neal Curtin at (202) 512-4914 or curtinn@gao.gov; or Paul Francis at (202) 512-2811 or francisp@gao.gov.

UNMANNED AERIAL VEHICLES

Major Management Issues Facing DOD's Development and Fielding Efforts

What GAO Found

GAO's most recent report points out that while DOD has taken some positive steps, its approach to UAV planning still does not provide reasonable assurance that the significant Congressional investment in UAVs will result in their effective integration into the force structure. In 2001, DOD established the joint UAV Planning Task Force in the Office of the Secretary of Defense to promote a common vision for UAV-related efforts and to establish interoperability standards. To communicate its vision and promote UAV interoperability, the task force issued the 2002 UAV *Roadmap*. While the *Roadmap* provides some strategic guidance for the development of UAV technology, neither the *Roadmap* nor other documents represent a comprehensive strategic plan to ensure that the services and other DOD agencies focus development efforts on systems that complement each other, will perform the range of priority missions needed, and avoid duplication. Moreover, the Task Force has only advisory authority and, as such, cannot compel the services to adopt its suggestions.

GAO's prior work supports the need for effective oversight of individual UAV programs at the departmental level. UAVs have suffered from requirements growth, risky acquisition strategies, and uncertain funding support within the services. Some programs have been terminated. Success has been achieved as a result of top-level intervention and innovative acquisition approaches. For example, in 2003, the Office of the Secretary of Defense had to intervene to keep the Unmanned Combat Air Vehicle program viable. As UAV programs grow in the future, they will face challenges in the form of increased funding competition, greater demand for capabilities, and spectrum and airspace limitations. Moreover, UAVs are no longer an additional "nice-to-have" capability; they are becoming essential to the services' ability to conduct modern warfare. Meeting these challenges will require continued strong leadership, building on the UAV *Roadmap* and Planning Task Force as GAO has recommended.

The Air Force Predator UAV



Source: U.S. Air Force

Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to appear before you today to discuss the major management issues that we identified in our current and prior work on the research, development, and fielding of the latest generation of unmanned aerial vehicles (UAV) by the Department of Defense (DOD). The current generation of UAVs has been under development for defense applications since the 1980s, and as DOD continues to transform the way in which it conducts military operations, UAVs are becoming a vital part of the force structure.

For our statement today, you asked us to discuss the results of our most recent report to the subcommittee, which is being released today.¹ In this report, we summarized recent UAV costs and funding, and analyzed DOD's approach to developing and fielding UAVs to see to what extent the approach provides reasonable assurance that UAV programs will be efficiently integrated into the force structure. You also asked that we summarize the major management issues we have identified in prior reports on UAV programs, including our 2003 report on the unmanned combat aerial vehicle.²

Summary

In our report being released today, we point out that funding for UAV research and development and procurement has been increasing in recent years, and Congress has actually provided more funds for UAV acquisition than DOD requested. During the past 5 fiscal years, Congress provided about \$2.7 billion in funding for UAV development and procurement as compared with about \$2.3 billion requested by DOD. Additionally, spending on operations and maintenance for UAVs has been increasing as DOD has begun using UAV systems in recent military operations. This growing spending reflects the importance that Congress has placed on UAVs as they have demonstrated success in recent operations. We also report that DOD's approach to planning for UAVs does not provide reasonable assurance that the investment will result in the effective

¹ U.S. General Accounting Office, *Force Structure: Improved Strategic Planning Can Enhance DOD's Unmanned Aerial Vehicles Efforts*, GAO-04-342 (Washington, D.C.: Mar 17, 2004).

² U.S. General Accounting Office, *Defense Acquisitions: Matching Resources with Requirements Is Key to the Unmanned Combat Air Vehicle Program's Success*, GAO-03-598 (Washington, D.C.: June 30, 2003).

integration of UAV programs into the force structure. We recognize that DOD has taken certain positive steps to improve the UAV program's management. For example, to help manage UAV development, in 2001 DOD established a joint UAV Planning Task Force in the Office of the Secretary of Defense to promote a common vision for UAV-related efforts and to establish interoperability standards. Also, to communicate its vision and promote UAV interoperability, the Task Force issued the 2002 *UAV Roadmap*, which describes current programs, identifies potential missions for UAVs, and provides guidance on developing emerging technologies. Our concern, however, is that neither the *Roadmap* nor other defense planning documents represent a comprehensive strategic plan to ensure that the services and other DOD agencies focus development efforts on systems that complement each other, will perform the range of priority missions needed, and avoid duplication. Moreover, the joint UAV Planning Task Force does not have program directive authority and serves only in an advisory capacity to the Under Secretary of Defense for Acquisitions, Technology, and Logistics. Without a strategic plan and an oversight body with sufficient authority to implement the plan, DOD risks poorly integrating UAVs into the force structure, which could increase development, procurement, and logistics costs, and increase the risk of future interoperability problems. Consequently, in our most recent report we recommended that DOD (1) establish a strategic plan to guide UAV development and fielding and (2) designate the joint UAV Planning Task Force or other appropriate body to oversee the plan's implementation, ensuring sufficient authority is provided.

Our prior work on UAV systems identifies the growing importance of UAVs to effective military operations and the need for the effective oversight of service programs at the departmental level. Over the years, UAV acquisition programs have suffered from requirements growth, risky acquisition strategies, and uncertain funding support within individual services. Some of these programs have been terminated. Program success has been achieved as a result of leadership intervention and the use of innovative approaches like the Advanced Concept Technology Demonstration.³ DOD's experience with the Unmanned Combat Air Vehicle program is a case in point; intervention by the Office of the Secretary of Defense was necessary to keep the program viable. Over the

³ The Advanced Concept Technology Demonstration program was initiated by DOD in 1994 as a way to get new technologies that meet critical military needs into the hands of users faster and at less cost than the traditional acquisition process.

years, we have reported that DOD has faced some expensive lessons in managing its UAV program. As UAVs become more and more integral to the way the U.S. military carries out operations, it will become even more important that the department manages its program effectively. UAVs are no longer an additional "nice-to-have" capability; they are becoming essential to the services' ability to conduct modern warfare. The acquisition environment for new UAVs will be characterized by increased funding competition, greater demand for UAV capabilities, and electromagnetic frequency spectrum and airspace limitations. This will require strong leadership at the departmental level, building on the UAV *Roadmap* and efforts of the joint UAV Planning Task Force, to ensure that the most cost-effective solutions are adopted as we have recommended in our previous work.

Background

DOD defines a UAV as a powered aerial vehicle that does not carry a human operator; can be land-, air-, or ship-launched; uses aerodynamic forces to provide lift; can be autonomously or remotely piloted; can be expendable or recoverable; and can carry a lethal or nonlethal payload. Generally, UAVs consist of the aerial vehicle; a flight control station; information and retrieval or processing stations; and, sometimes, wheeled land vehicles that carry launch and recovery platforms.

UAVs have been used in a variety of forms and for a variety of missions for many years. After the Soviet Union shot down a U-2 spy plane in 1960, certain UAVs were developed to monitor Soviet and Chinese nuclear testing. Israel used UAVs to locate Syrian radars and was able to destroy the Syrian air defense system in Lebanon in 1982. The United States has used UAVs in the Persian Gulf War, Bosnia, Operation Enduring Freedom, and Operation Iraqi Freedom for intelligence, surveillance, and reconnaissance missions and to attack a vehicle carrying suspected terrorists in Yemen in 2002. The United States is also considering using UAVs to assist with border security for homeland security or homeland defense.

The current generation of UAVs has been under development for defense applications since the 1980s. UAVs won considerable acceptance during military operations in Afghanistan and Iraq in 2002 and 2003, respectively. They were used in these operations to observe, track, target, and in some cases strike enemy forces. These and similar successes have heightened interest in UAVs within DOD and the services. In fact, by 2010, DOD plans to have at least 14 different UAVs in the force structure to perform a variety of missions. Moreover, in the fiscal year 2001 National Defense

Authorization Act, Congress established the goal that one-third of the Air Force's deep-strike capability be provided by UAVs by 2010.⁴

The overall management of UAV programs has gone full circle. In 1989 the DOD Director of Defense Research and Engineering set up the UAV Joint Project Office as a single DOD organization with management responsibility for UAV programs. With the Navy as the Executive Agency, within 4 years the Joint Project Office came under criticism for a lack of progress. Replacing the office in 1993, DOD created the Defense Airborne Reconnaissance Office as the primary management oversight and coordination office for all departmentwide manned and unmanned reconnaissance. In 1998, however, this office also came under criticism for its management approach and slow progress in fielding UAVs. In that same year, this office was dissolved and UAV program development and acquisition management was given to the services, while the Assistant Secretary of Defense for Command, Control, Communications and Intelligence was assigned to provide oversight for the Secretary of Defense.

GAO's New Report Calls for Improved Strategic Planning

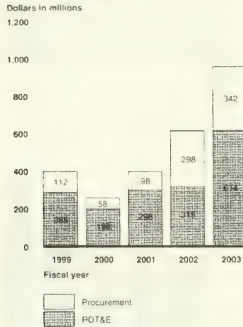
Our report being issued today (*Force Structure: Improved Strategic Planning Can Enhance DOD's Unmanned Aerial Vehicles Efforts*, GAO-04-342, Mar. 17, 2004) analyzes recent funding trends for UAVs and makes recommendations to strengthen DOD's strategic planning and management approach for UAVs.

UAV Funding Has Increased

During the past 5 fiscal years, Congress provided funding for UAV development and procurement that exceeds the amounts requested by DOD, and to date the services have obligated about 99 percent of these funds. To promote the rapid employment of UAVs, Congress appropriated nearly \$2.7 billion to develop and acquire UAVs from fiscal year 1999 through fiscal year 2003, compared with the \$2.3 billion requested by DOD. The majority of the funds—\$1.8 billion (67 percent)—have been for UAV research, development, test, and evaluation. Figure 1 displays the trends in research, development, test, and evaluation and procurement funding from fiscal year 1999 through fiscal year 2003.

⁴ P.L. 106-398, Section 220

Figure 1: UAV Research, Development, Test, and Evaluation (RDT&E) and Procurement Obligations, Fiscal Years 1999-2003



Sources: DOD (data); GAO analysis.

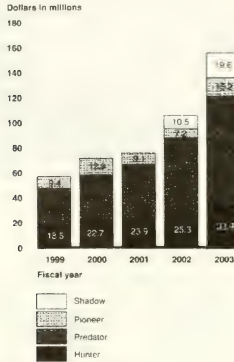
Over these 5 years, only three systems—the Air Force's Predator and Global Hawk, and the Army's Shadow—have matured to the point that they required procurement funding, amounting to about \$880 million by fiscal year 2003 and another estimated \$938 million needed by fiscal year 2005.

Because Congress has appropriated more funds than requested, the services are able to acquire systems at a greater rate than planned. For example, in fiscal year 2003, the Air Force requested \$23 million to buy 7 Predator UAVs, but Congress provided over \$131 million, enough to buy 29 Predators. The Air Force had obligated 71 percent of the Predator's fiscal year 2003 funding during its first program year.

The Hunter, Predator, Pioneer, and Shadow are among the UAV systems currently being used, and therefore we determined the level of DOD's operations and maintenance spending from fiscal year 1999 through fiscal year 2003 for these systems. Operations and maintenance funding has steadily increased over that period from about \$56.6 million for three of

the systems to \$155.2 million in 2003 for all four. These increases are the result of a larger inventory of existing systems and the introduction of new systems. Figure 2 displays the operations and maintenance spending for these UAV systems for fiscal years 1999 to 2003.

Figure 2: Operations and Maintenance Funding for UAVs, for Fiscal Years 1999 to 2003



Sources: DOD (data); GAO (analysis).

Progress Made, but Challenges Remain in UAV Planning

DOD has taken certain positive steps to improve the management of the UAV program by establishing a program focal point in the joint UAV Planning Task Force and trying to communicate a common vision for UAV development, the *UAV Roadmap*. While the creation of the Task Force and the *UAV Roadmap* are important steps to improve the management of the program, they are not enough to reasonably assure that DOD is developing and fielding UAVs efficiently. The Task Force's authority is generally limited to program review and advice, but is insufficient to enforce program direction. Moreover, the *UAV Roadmap* does not constitute a

comprehensive strategic plan for developing and integrating UAVs into force structure.

Some Positive Steps Have Been Taken to Improve Program Management

Since 2000, DOD has taken several positive steps to improve the management of the UAV program. In October 2001, the Under Secretary of Defense for Acquisition, Technology, and Logistics created the joint UAV Planning Task Force as the joint advocate for developing and fielding UAVs. The Task Force is the focal point to coordinate UAV efforts throughout DOD, helping to create a common vision for future UAV-related activities and to establish interoperability standards. For example, the Task Force is charged with developing and coordinating detailed UAV development plans, recommending priorities for development and procurement efforts, and providing the services and defense agencies with implementing guidance for common UAV programs.

The development of the 2002 *Roadmap* has been the Task Force's primary product to communicate its vision and promote interoperability. The *Roadmap* is designed to guide U.S. military planning for UAV development through 2027, and describes current programs, identifies potential missions, and provides guidance on developing emerging technologies. The *Roadmap* is also intended to assist DOD decision makers to build a long-range strategy for UAV development and acquisition in such future planning efforts as the Quadrennial Defense Review or other planning efforts.

The Joint UAV Planning Task Force Has Limited Authority

The joint UAV Planning Task Force's authority is generally limited to program review and advice, but is insufficient to enforce program direction. The Task Force Director testified before the House Armed Services Committee in March 2003 that the Task Force does not have program directive authority, but provides the Under Secretary of Defense for Acquisition, Technology, and Logistics with advice and recommended actions.⁵ Without such authority, according to the Director, the Task Force seeks to influence services' programs by making recommendations to them or proposing recommended program changes for consideration by the Under Secretary. According to defense officials, the Task Force has attempted to influence the joint direction of service UAV efforts in a variety of ways, such as reviewing services' budget proposals, conducting

⁵ Statement of the Director, Joint UAV Planning Task Force before the Subcommittee on Tactical Air and Land Forces, House Armed Services Committee, March 26, 2003.

periodic program reviews, and participating in various UAV-related task teams and has had some successes, as shown below:

- The Task Force has encouraged the Navy to initially consider an existing UAV (Global Hawk) rather than develop a unique UAV for its Broad Area Marine Surveillance mission.
- The Task Force has worked with the Army's tactical UAV program to encourage it to consider using the Navy's Fire Scout as an initial platform for the Future Combat System class IV UAV.
- The Task Force convinced the Air Force to continue with the Unmanned Combat Aerial Vehicle program last year when the Air Force wanted to terminate it, and the Task Force ultimately helped the then-separate Air Force and Navy programs merge into a joint program.
- The Task Force convinced the Navy not to terminate the Fire Scout rotary wing UAV program as planned.

However, the Task Force cannot compel the services to adopt any of its suggestions and consequently has not always succeeding in influencing service actions. For example, according to DOD officials, no significant progress has been made in achieving better interoperability among the services in UAV platform and sensor coordination, although efforts are continuing in this vein.

DOD Has No Comprehensive Strategic Plan

Neither the *Roadmap* nor other DOD guidance documents represent a comprehensive strategy to guide the development and fielding of UAVs that complement each other, perform the range of missions needed, and avoid duplication. DOD officials acknowledged that the Office of the Secretary of Defense has not issued any guidance that establishes an overall strategy for UAVs in DOD. While high-level DOD strategic-planning documents—such as the National Military Strategy, the Joint Vision 2020, and the Defense Planning Guidance—provide some general encouragement to pursue transformational technologies, including the development of UAVs, these documents do not provide any specific guidance on developing and integrating UAVs into the force structure.

At the same time, while the Joint Requirements Oversight Council⁶ has reviewed several UAVs and issued guidance for some systems, neither the Joint Staff nor the council has issued any guidance that would establish a strategic plan or overarching architecture for DOD's current and future UAVs. In June 2003, the Chairman of the Joint Chiefs of Staff created the Joint Capabilities Integration and Development System to provide a top-down capability-based process. Under the system, five boards have been chartered, each representing a major warfighting capability area as follows: (1) command and control, (2) force application, (3) battle space awareness, (4) force protection, and (5) focused logistics. Each board has representatives from the services, the combatant commanders, and certain major functions of the Under Secretary of Defense. Each board is tasked with developing a list of capabilities needed to conduct joint operations in its respective functional areas. The transformation of these capabilities is expected, and the boards are likely to identify specific capabilities that can be met by UAVs. Nonetheless, according to Joint Staff officials, these initiatives will not result in an overarching architecture for UAVs. However, the identification of capabilities that can be met by UAVs is expected to help enhance the understanding of DOD's overall requirement for UAV capabilities.

Moreover, according to officials in the Office of the Secretary of Defense, the UAV *Roadmap* was not intended to provide an overarching architecture for UAVs. The *Roadmap* does state that it is intended to assist DOD decision makers in building a long-range strategy for UAV development and acquisition in such future planning efforts as the Quadrennial Defense Review. Nonetheless, the *Roadmap* represents a start on a strategic plan because it incorporates some of the key components of strategic planning, as shown below:

Long-term goals—The *Roadmap* states its overall purpose and what it hopes to encourage the services to attain. The *Roadmap* refers to the Defense Planning Guidance's intent for UAVs as a capability and indicates that the guidance encourages the rapid advancement of this capability. At the same time, it does not clearly state DOD's overall or long-term goals for its UAV efforts. Similarly, while it states that it wants to provide the services with

⁶ The Joint Requirements Oversight Council is a joint organization made up of senior representatives from each of the services to review joint experimentation and make appropriate recommendations to the Chairman of the Joint Chiefs of Staff, CJCSI 3180.1 (Washington, D.C.: Oct. 31, 2002).

clear direction, it does not clearly identify DOD's vision for its UAV force structure through 2027.

Approaches to obtain long-term goals—The *Roadmap's* "Approach" section provides a strategy for developing the *Roadmap* and meeting its goal. This approach primarily deals with identifying requirements and linking them to needed UAV payload capabilities, such as sensors and associated communication links. The approach then ties these requirements to forecasted trends in developing technologies as a means to try to develop a realistic assessment of the state of the technology in the future and the extent to which this technology will be sufficient to meet identified requirements. At the same time, however, the *Roadmap* does not provide a clear description of a strategy for defining how to develop and integrate UAVs into the future force structure. For example, the *Roadmap* does not attempt to establish UAV development or fielding priorities, nor does it identify the most urgent mission-capability requirements. Moreover, without the sufficient identification of priorities, the *Roadmap* cannot link these priorities to current or developing UAV programs and technology.

Performance goals—The *Roadmap* established 49 specific performance goals for a variety of tasks. Some of these goals are aimed at fielding transformational capabilities without specifying the missions to be supported. Others are to establish joint standards and control costs. Nonetheless, of the 49 goals, only 1 deals directly with developing and fielding a specific category of UAV platform to meet a priority mission-capability requirement—the suppression of enemy air defenses or strike electronic attack. The remaining goals, such as developing heavy-fuel aviation engines suitable for UAVs, are predominantly associated with developing UAV or related technologies as well as UAV-related standards and policies to promote more efficient and effective joint UAV operations. However, the *Roadmap* does not establish overall UAV program goals.

Performance indicators—Some of the 49 goals have performance indicators that could be used to evaluate progress, while others do not. Furthermore, the *Roadmap* does not establish indicators that readily assess how well the program will meet the priority mission capabilities.

As the services and defense agencies pursue separate UAV programs, they risk developing systems with duplicate capabilities, potentially higher operating costs, and increased interoperability challenges. The House Appropriations Committee was concerned that without comprehensive planning and review, there is no clear path toward developing a UAV force structure.⁷ Thus, the committee directed that each service update or create a UAV roadmap. These roadmaps were to address the services' plans for the development of future UAVs and how current UAVs are being employed. Officials from each of the services indicated that their UAV roadmap was developed to primarily address their individual service's requirements and operational concepts. However, in their views, such guidance as the Joint Vision 2020, National Military Strategy, and Defense Planning Guidance did not constitute strategic plans for UAVs to guide the development of their individual service's UAV roadmap. These officials further stated that the Office of the Secretary of Defense's 2002 *UAV Roadmap* provided some useful guidance, but was not used to guide the development of the service's UAV roadmaps. Moreover, they did not view the Office of the Secretary of Defense's *Roadmap* as either a DOD-wide strategic plan or an overarching architecture for integrating UAVs into the force structure. According to service officials developing the service-level UAV roadmaps, there was little collaboration with other services' UAV efforts.

As we have described for you today, DOD has an opportunity to enhance its strategic planning to improve the management of UAV development and fielding. In the report released to you today, we make two recommendations to assist DOD to enhance its management control over the UAV program. We recommend that DOD establish a strategic plan or set of plans based on mission requirements to guide UAV development and fielding. We also recommend that DOD designate the joint UAV Planning Task Force or another appropriate organization to oversee the implementation of a UAV strategic plan. In responding to our report, DOD stated that it partially concurred with the first recommendation but preferred to address UAV planning through the Joint Capabilities Integration and Development System process. DOD disagreed with the second recommendation saying that it did not need to provide an organization within the department with more authority because it believes that the Undersecretary of Defense for Acquisition, Logistics, and Technology already has sufficient authority to achieve DOD's UAV goals.

⁷ Department of Defense Appropriation Bill, 2003 Report, H.R. Rep. No. 107-532 at 207.

Our report states clearly that we continue to support both recommendations. We believe that the growth in the number and cost of UAV programs, and their importance to military capabilities, will need more formalized oversight by DOD.

Oversight Challenge Is Framed by Experiences of the Past and Demands of the Future

Our reviews of system development efforts over the last several decades show that the road to fielding operational UAVs has not been easy. Success has been achieved as a result of intervention by leadership and the use of innovative processes. Even when put on a sound footing, these programs have continued to face new challenges. In the future, UAVs will be growing in number, sophistication, and significance, but will also have to compete for increasingly scarce funds, electromagnetic frequency spectrum, and airspace.

Lessons From Past Experience

Since the mid 1970s, we have reviewed many individual DOD UAV development efforts.⁸ A list of our reports is attached in the section entitled "Related GAO Products." Our previous work has highlighted problems that addressed congressional efforts to bring the development process under control and subsequently led to the termination or redesign and retrofit of a number of these development efforts.

In 1988 we reported on a variety of management challenges related to UAV development.⁹ At that time, congressional committees had expressed concern about duplication in the services' UAV programs, which ran counter to the committees' wishes that DOD acquire UAVs to meet common service needs. In 1988, we noted that DOD was to provide, at minimum, a UAV master plan that (1) harmonized service requirements, (2) utilized commonality to the maximum extent possible, and (3) made trade-offs between manned and unmanned vehicles in order to provide future cost savings. After budget deliberations for fiscal year 1988, Congress eliminated separate service accounts for individual UAV programs and consolidated that funding into a single Defense Agencies account. This in turn led to the formation of DOD's UAV Joint Projects Office, which promoted joint UAV efforts that would prevent unnecessary

⁸ U.S. General Accounting Office, *Status of the Remotely Piloted Aircraft Programs*. GAO/PSAD-77-90 (Washington, D.C. February 18, 1977).

⁹ U.S. General Accounting Office, *Unmanned Vehicles: Assessment of DOD's Unmanned Aerial Vehicle Master Plan*, GAO/NSIAD-89-118R (Washington, D.C. Dec. 9, 1988).

duplication. This effort was led by the Defense Airborne Reconnaissance Office within the Office of the Secretary of Defense, which has since been disbanded.

Our analysis of DOD's 1988 UAV master plan identified a number of weaknesses: (1) it did not eliminate duplication, (2) it continued to permit the proliferation of single-service programs, (3) it did not adequately consider cost savings potential from manned and unmanned aircraft trade-offs, and (4) it did not adequately emphasize the importance of common payloads among different UAV platforms.

In testimony presented in April 1997, we recognized the strong support that Congress had provided for DOD's UAV acquisition efforts and how it had encouraged the department to spur related cooperation between the services.¹⁰ We noted that problems with UAV development continued and were leading to cost, schedule, and performance deficiencies; continued duplication of UAV capabilities; and even program cancellations in many instances. In 1997, only one UAV—the Pioneer—had been fielded.

Factors That Limit UAV Development

Since 1997, we have continued to evaluate the department's UAV development efforts, including plans to develop a lethal variant of UAVs called unmanned combat air vehicles. Our reviews over the last 27 years have revealed several reasons why UAV efforts have not been successful, including requirements that outstrip technology, overly ambitious schedules, and difficulties integrating UAV components and UAV testing. We have also found that UAV system acquisitions processes were not protected from what is known as "requirements creep." These requirements changes increase development and procurement costs significantly. For example:

- The Aquila was started in 1979 with a straightforward mission to provide small, propeller-driven UAVs to give group commanders real-time battlefield information about enemy forces beyond ground observers' line of sight.¹¹ Requirements creep increased complexity and development and anticipated procurement costs significantly. For

¹⁰ U.S. General Accounting Office, *Unmanned Aerial Vehicles: DOD's Acquisition Efforts*, GAO/T-NSIAD-97-138 (Washington, D.C.: April 9, 1997).

¹¹ U.S. General Accounting Office, *Aquila Remotely Piloted Vehicle: Its Potential Battlefield Contribution Still in Doubt*, GAO/NSIAD-88-19 (Washington, D.C.: October 26, 1987).

example, in 1982 a requirement for night vision capability was added which increased development costs due to the additional payloads and air vehicles needed to meet the new requirement. During operational tests, the Aquila successfully fulfilled all requirements in only 7 of 105 flights.

- When the Air Force's Global Hawk reconnaissance UAV was started in 1994, it was expected to have an average unit flyaway price of \$10 million. Changes in the aircraft's range and endurance objectives required the contractor to modify the wings and other structural parts, and by 1999 its cost had increased by almost 50 percent. In our April 2000 report, we concluded that the cost of air vehicles to be produced could increase still further, because the Air Force had not finalized its design requirements.¹² In 2002, the Global Hawk program adopted a higher-risk strategy that calls for both a larger, more advanced aircraft and an accelerated delivery schedule.
- In June 2003 we reported that the original requirements for the Air Force's unmanned combat air vehicle (UCAV) program posed significant, but manageable challenges to build an air vehicle that is affordable throughout its life cycle, highly survivable, and lethal.¹³ Subsequently, however, the Air Force added requirements—adding a mission and increasing flying range. This action widened the gap between requirements and resources and increased the challenge for the development program.

Aside from the air vehicle, other ground and airborne systems are also needed for the UAV to be complete. DOD's practice of buying systems before successful completion of testing has repeatedly led to defective systems that were terminated, redesigned, or retrofitted to achieve satisfactory performance. Our reviews have shown that, before production begins, DOD needs to test to ensure that all key parts of the UAV system can work successfully together, and that it can be operated and maintained affordably throughout its lifecycle.

¹² U.S. General Accounting Office, *Unmanned Aerial Vehicles: Progress of the Global Hawk Advanced Concept Technology Demonstration*, GAO/NSIAD-00-75 (Washington, D.C.: April 25, 2000).

¹³ GAO-03-598.

- In March 1999, we examined the Medium Range UAV, which began in 1989 as a joint effort of the Navy and Air Force.¹⁴ The Air Force was to design and build the sensor payload, including cameras, a videotape recorder, and a communications data link that would send back the imagery from the UAV. The Navy was to design and build the air vehicle. Splitting and then integrating these development efforts became problematic. The Air Force ran into major payload development difficulties, which impacted payload development costs. As a result of the difficulties, the payload program fell behind schedule, developmental tests on a surrogate manned aircraft¹⁵ were unsuccessful, and the payload was too big to fit in the space the Navy had allotted inside the aircraft. In 1993, the program was terminated.
- In 1999, the Army began low-rate initial production of four Shadow systems at the same time that it began the engineering and manufacturing development phase. In February 2001, the Army sought to revise its acquisition strategy to procure four additional Shadow systems before conducting operational tests. We recommended in a 2000 report that the Army not buy these four additional systems until after operational testing is completed.¹⁶ In our opinion, only operational testing of the system in a realistic environment can show whether the overall system would meet the Army's operational needs. Subsequently, we reported that problems encountered during early tests forced the program to delay completion of operational testing by one year. The results of operational tests revealed that the Shadow was not operationally suitable, survivable, and may not be affordable.

Factors That Lead to UAV Success

Our body of UAV work also made several observations about factors that contribute to success, including the use of innovative approaches and high-level interventions by individuals and organizations. In August 1999, we concluded that DOD's use of Advanced Concept Technology Demonstration projects improved UAV acquisitions because it focused on maturing technology and proving military utility before committing to a

¹⁴ U.S. General Accounting Office, *Unmanned Aerial Vehicles: Medium Range System Components Do Not Fit*, GAO/NSIAD-99-2 (Washington, D.C.: March 25, 1999)

¹⁵ A surrogate manned aircraft is a conventional aircraft with unmanned controls that is being operated as a UAV with a pilot on board to override controls in the event of an emergency.

¹⁶ U.S. General Accounting Office, *Unmanned Aerial Vehicles: Questionable Basis for Revisions to Shadow 200 Acquisition Strategy*, GAO/NSIAD-00-204 (Washington, D.C.: September 26, 2000).

UAV.¹⁷ We found that DOD's Advanced Concept Technology Demonstration approach was consistent with the practices that we typically characterize as leading commercial development efforts. Predator UAV used a 30-month Advanced Concept Technology Demonstration approach and prototypes were deployed in Bosnia in 1995 and 1996 as part of the demonstration. Performance data gathered there convinced military users that Predator was worth acquiring.

High-level individuals intervened to set resource constraints and encouraged evolutionary acquisition strategies on the Air Force's Global Hawk, the Army's Shadow UAV, and the Joint Unmanned Combat Air System programs.

- In the initial Shadow program, the Army's top military acquisition executive reached an agreement with his counterpart in the requirements community that limited the program to "must have" capabilities and restrained resources such as cost. This resulted in the need to make trade-offs—so the Army lowered the performance requirement for the imagery sensor so that existing technology could be used.¹⁸
- In the Global Hawk program, the Under Secretary of Defense (Acquisition, Technology, and Logistics) became personally involved and insisted that the program take an evolutionary approach, developing and fielding different versions of increasingly capable UAVs. He also placed cost constraints on the initial version, which enabled more advanced imagery sensor capabilities to be deferred for later versions of the UAV.
- In our report on the Unmanned Combat Air Vehicle program, we reported on Air Force plans to have initial deliveries of a lethal-strike-capable aircraft by 2011.¹⁹ The Air Force had abandoned the Unmanned Combat Air Vehicle initial low-risk approach to development, and increased requirements and accelerated its program schedule shortly

¹⁷ U.S. General Accounting Office, *Unmanned Aerial Vehicles: DOD's Demonstration Approach Has Improved Project Outcomes*, GAO/NSIAD-99-53 (Washington, D.C.: August 30, 1999).

¹⁸ U.S. General Accounting Office, *Best Practices: Better Matching of Needs and Resources Will Lead to Better Weapon System Outcomes*, GAO-01-288 (Washington, D.C.: March 8, 2001).

¹⁹ GAO-03-598.

before it was to shift to the product development stage. As previously reported, it took intervention by the Office of the Secretary of Defense to resolve requirements and funding challenges and maintain strong oversight over the program. The Task Force also was instrumental in getting the funding restored to the program, creating a joint effort between the Air Force and Navy, and accelerating the Navy's version. Their strong oversight and intervention might have saved the program, which is now known as the Joint Unmanned Combat Air System program.

Future Challenges in Oversight of UAVs

Over the next decade, DOD plans show that UAV investments will increase, greater numbers will be fielded, and these systems will play more significant roles than in the past. In addition to overcoming the problems and pressures that have impaired past programs, managers of future UAV programs will face increasing competition for money, electromagnetic frequency spectrum bandwidth, and airspace.

By 2010, DOD plans to invest \$11 billion in UAV acquisitions, quadrupling the number of systems in its inventory today. As UAV programs vie for increased funding, they will have to compete against very large programs, such as the F/A-22 and the Joint Strike Fighter. If the costs of acquisition programs continue to exceed what has been set aside in the budget, competition will intensify and funding could be jeopardized.

Initially, UAVs were seen as complementary systems that augmented capabilities the warfighter already had. They were, in a sense, "another pair of eyes." We are already seeing the evolution of UAVs into more significant roles, for which they provide primary capability. For example, the Global Hawk is being seen as replacing the U-2 reconnaissance aircraft, and the Unmanned Combat Air Vehicle may eventually perform electronic warfare missions that the EA-6 Prowler aircraft performs today. UAVs are figuring prominently in plans to transform the military into a more strategically responsive force. UAVs are expected to be an integral part of this information-based force. For example, UAVs may serve as relay nodes in the Future Combat System's command and control network. As UAVs perform increasingly significant roles, their payloads and designs will likely become more sophisticated.

UAVs depend on the available space in the electromagnetic frequency spectrum to send and receive signals. Such signals are essential to UAV control, communications, and imagery. As the number of UAVs grows, the systems will have to compete for more room on the spectrum. Spectrum

resources are scarce and facing increased demands from sources other than UAVs. Because of the changing nature of warfighting, more and more military systems are coming to depend on the spectrum to guide precision weapons and obtain information superiority. Recently, because of advances in commercial technology, a competition for scarce frequency spectrum has developed between government and nongovernment users.

Moreover, as the growing number of UAV systems become available for military units and civilian agencies, such as the Department of Homeland Security, their operation will also need to be integrated into the national airspace system. Currently, the Federal Aviation Administration requires detailed coordination and approval of UAV flights in the national airspace system. The Federal Aviation Administration and DOD are working on how to better integrate military UAVs within the national air space system. In the future, UAVs are going to be used for homeland security, and their acceptance into civil airspace may be difficult to accomplish until significant work is accomplished in the areas of reliability, regulation, communications, and collision avoidance.

Concluding Remarks

Recent operations are convincing military commanders that UAVs are of real value to the warfighter. That success on the battlefield is leading to more and more demand for UAVs and innovative ways of using them, creating pressures such as a greater need for interoperability of systems and competition for limited resources like money, electromagnetic frequency spectrum, and airspace. The UAVs that are successful today survived an environment characterized by a number of canceled programs, risky strategies, uncoordinated efforts, and uncertain funding. It took additional measures for them to succeed, not the least of which was strong management intervention. In recent years, DOD has taken positive steps to better manage the development of UAVs by creating the joint UAV Planning Task Force and the UAV Roadmap. The question is whether these steps will be sufficient to make the most out of current and future investments in UAVs. We believe that DOD should build on these good steps so that it will be in a better position to provide stewardship over these investments. Taking these steps will give Congress confidence that its investments in the technology will produce optimum capabilities desired of UAVs.

Mr. Chairman, this concludes our prepared statement. We would be happy to answer any questions that you or Members of the subcommittee may have.

Contacts and Staff Acknowledgements

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TESTIMONY OF

DR. GLENN F. LAMARTIN

DIRECTOR, DEFENSE SYSTEMS

OFFICE OF THE UNDER SECRETARY OF DEFENSE

(ACQUISITION, TECHNOLOGY AND LOGISTICS)

BEFORE THE UNITED STATES HOUSE

COMMITTEE ON ARMED SERVICES

SUBCOMMITTEE ON TACTICAL AIR AND

LAND FORCES

March 17, 2004

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**STATEMENT BY
DR. GLENN F. LAMARTIN
DIRECTOR, DEFENSE SYSTEMS
OFFICE OF THE UNDER SECRETARY OF DEFENSE
(ACQUISITION, TECHNOLOGY AND LOGISTICS)**

**BEFORE THE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES
HOUSE ARMED SERVICE COMMITTEE
UNITED STATES HOUSE OF REPRESENTATIVES
MARCH 17, 2004**

INTRODUCTION

Good morning Mr. Chairman, Mr. Abercrombie, and Members of the Committee. Thank you for the opportunity to express the Department's views on the progress we have made in our Unmanned Aerial Vehicle (UAV) and Unmanned Combat Air Vehicle (UCAV) programs. This committee has consistently provided direction and support to our efforts in development and migration of UAVs to the joint force. Many of our UAV-related successes we owe in large part to the unwavering support this committee has provided. We thank you for that.

As you know, we are approaching the one-year anniversary of the start of sustained combat operations for Operation IRAQI FREEDOM. On March 19, 2003, forces of the United States and United Kingdom began military operations in what was one of the most successful military operations in this country's history. UAVs played a major role in the 26-day combat campaign to end Saddam Hussein's strangle hold on Iraq, and UAVs continue to play an important role in efforts to stabilize the country for transition to a democratic form of government. During the campaign, more than ten different UAV systems supported combat and combat support operations. This is noteworthy when one recalls that the Department operated but one UAV system in support of Operation DESERT STORM in 1991. Today, our UAV systems are deployed and engaged in Iraq and Afghanistan, in continued support of the global war on terrorism.

Taken as a whole, this technology area is one of the best examples of the Department's effort to rapidly transform our military and its conduct of warfare.

DEFENSE DEPARTMENT UAV PROGRAMS

Mr. Chairman, I am the Director of Defense Systems within the Office of the Under Secretary of Defense (Acquisition, Technology and Logistics) (USD(AT&L)). The UAV Planning Task Force is one of the organizations under my purview, and that is why I am here before you today. The task force's goal is to ensure that we acquire the Department's unmanned aerial systems in a coordinated and efficient manner. One task force product is the DoD UAV roadmap. The second edition, dated December 2002, is being updated; we anticipate its release early next year. Today, I will describe the status of the Department's efforts to provide this transformational technology for our combatant commanders' military toolbox.

Army UAV Programs

The Army has two tactical UAV systems that are operational – the RQ-7 Shadow and the RQ-5 Hunter. Both have been deployed to Iraq since hostilities began on March 19 of last year and are in great demand. Both systems have flown thousands of flight hours and are also being used in new mission areas.

Shadow is the first UAV system we have fielded through the normal acquisition process. It provides a low cost, organic intelligence, surveillance, and reconnaissance (ISR) capability to the tactical commander. It successfully completed Initial Operational Test and Evaluation in May of 2002. A true acquisition success story, this program went from contract award in December 1999 to initial operational capability in just 32 months. To date, the Army has fielded 12 systems, 8 to operational units of which 4 are directly supporting combat operations. As an example of how we are using UAVs in new mission areas, Shadow is operating as a force protection asset to oversee vehicle convoys. As a result of high demand, the Army is accelerating procurement of Shadow systems, 3 more for a total of 11 in Fiscal Year 2004. An example of competition and rapid delivery of basic capability, we will complete the entire Shadow acquisition by FY06, a two year acceleration over previous plans.

The Fiscal Year 2004 Appropriations Act included funding to further improve the Shadow air vehicle. An enhanced wing allowing Shadow to carry more fuel and increase its endurance by 20 percent is in development and testing. We are taking steps to integrate the tactical common data link (TCDL), a modern, digital, secure, broad-band link, that eliminates potential frequency interference conditions. Fielding such data links is one of the top ten goals in our UAV roadmap.

The Army's Hunter UAV provides division and corps commanders with a reconnaissance, surveillance, and target acquisition capability. As with Shadow, the Army will replace combat and training losses for Hunter in order to maintain a desired 85 percent operational readiness rate. Replacement Hunter air vehicles will be improved with a heavy fuel engine, an extended wing center section for additional fuel, a modern avionics package, and wing hard points for weapons. A recent test using Hunter to launch an anti-tank weapon was very successful, hitting and destroying eight of nine targets including both armored and soft vehicles.

We plan to replace Hunter with the new Extended Range/Multi-Purpose (ER/MP) UAV beginning in 2009. We are working with the Army to accelerate this critical acquisition to provide a long endurance platform with motion video and imaging radar capability and enhanced communications capability that includes theater relay and satellite connectivity. The Army intends to place an ER/MP UAV system composed of twelve air vehicles and five ground stations into each corps or division unit of employment.

The Air Force has provided Lynx radars to the Army for integration on the congressionally-supported I-GNAT system, a Predator-like system that is undergoing evaluation. The Army plans to deploy this system in April to CENTCOM to enhance tactical UAV imagery collection capability and continue development of operational concepts and tactics, techniques and procedures related to the ER/MP UAV. This is yet another example of the expanding use of UAVs for the Department.

Moving to the subject of smaller UAVs, Army special operations forces currently support operations in Afghanistan with a small, 4-pound, back-packable, reconnaissance UAV called the Raven. To also provide this capability to regular units operating in Iraq, the Army made a one-time commercial-off-the-shelf buy of 185 Raven systems,

including over 550 air vehicles. Every Army battalion deployed will be issued five systems; each system having three air vehicles.

The Army's Future Combat Systems (FCS) will include a number of UAV "classes" supporting the platoon and company levels, the battalion commander, and the unit of action and unit of employment commanders. The Fire Scout UAV, a Navy developed unmanned helicopter, has been selected as the largest of the FCS UAVs. We have not yet decided on system solutions for other FCS UAVs. At the core of FCS, including FCS UAVs, will be common system architectures, user interfaces, hardware, and software that provide interoperability among Army UAVs, with future forces, and joint C4ISR architectures.

Air Force UAV Programs

The Air Force continues to make progress in acquiring the high altitude, long endurance RQ-4A Global Hawk, the largest UAV in the Department's inventory. Early Advanced Concept Technology Demonstration (ACTD) versions of Global Hawk supported operations in Iraq last year with great success. Although accounting for only three percent of the total ISR sorties during the 26-day campaign, it provided over half of the time critical targeting data against Iraq's air defense assets. The Air Force has taken delivery of the first two production aircraft. By the summer of 2005, six more Global Hawks will deliver; two to the Navy to support a maritime surveillance demonstration. In early 2006, an improved B-model Global Hawk will deliver with a redesigned wing which will increase its payload capacity from 2000 to 3000 pounds and provide a 150 percent increase in on-board power generation capability. The Global Hawk spiral development process has enabled the rapid fielding of critical warfighter needs including an increasingly capable signals intelligence suite on this persistent platform. The Air Force intends to acquire a total of 51 Global Hawks through 2012.

The Air Force also operates the medium altitude, long endurance MQ-1 Predator with great success. During the Iraqi conflict, the Air Force used both in- and out-of-theater ground control stations, with beyond-line-of-sight air vehicle control, to fly Predator. This gave the Combined Forces Air Component Commander great flexibility since he could increase capability and have redundant control using up to five ground

control stations at multiple locations. Three orbits were controlled, via remote operations, from the United States. Four simultaneous Predator orbits were flown over Iraq, and an additional orbit operated over Afghanistan. This combined reach back operation, used for both Global Hawk and Predator, significantly reduced troop deployment, improved system availability, reduced theater force protection needs, and saved dollars. This concept of moving data rather than people was a demonstration of “networked” operations and another example of the rapidly evolving use of UAVs. Like Army’s Shadow and Hunter UAVs, Predator continues to support on-going operations in Iraq, where it has accumulated over 7000 flight hours.

The Air Force continues to upgrade the Predator fleet with congressional help. Enhancements include replacing the original electro-optical/infrared sensor ball with an improved one that adds a laser designator/rangefinder and adding wing hard-points and wiring to carry and launch two Hellfire missiles. These improvements evolve Predator into an armed reconnaissance platform which retains all the capability of a traditional ISR asset, and adds a direct strike capability. This enhanced capability shortens the kill chain and dramatically reduces the opportunity for targets to flee if tactical aircraft are unavailable to deliver weapons.

The Air Force is also acquiring the MQ-9 Predator B, a larger, more capable, turboprop-engined version of the Predator that adds more robust weapons capability and improved all weather intelligence collection. The Air Force also is incorporating a number of reliability enhancements. A demonstration using the laser guided GBU-12 munition is ongoing. The Office of the Secretary of Defense (OSD) has been a key proponent of Predator B.

Additionally, the Air Force operates small UAV systems for force protection and special operations. The Desert Hawk UAV is a 5-lb aerial system used by security personnel to improve situational awareness of the force protection battlespace by conducting area surveillance, patrolling base perimeters and runway approach and departure paths, and performing convoy overwatch. The Air Force is procuring the 4-lb Raven, and it’s buying the 10-lb Pointer UAV for Air Force Special Operation Forces.

Navy and Marine Corps UAV Activities

The Navy was the first Service to employ a UAV in combat during Operation DESERT STORM and, although the Navy has subsequently transferred the Pioneer UAV system to the Marine Corps, they have plans to acquire several new UAV systems. Their planning includes the tactical Fire Scout, an unmanned helicopter, to provide the Littoral Combat Ship an organic UAV capability in 2007. The Navy and Army are working together to achieve a common Fire Scout UAV air vehicle.

They are also planning to begin the development of a high altitude, long endurance Broad Area Maritime Surveillance UAV to provide a world-wide access, persistent maritime ISR capability in 2010. Potential platforms are a maritime version of Global Hawk, a maritime version of the Predator B, and an unmanned version of the Gulfstream 550.

The Navy's Global Hawk Maritime Demonstration will use two Global Hawk air vehicles - - procured in concert with the Air Force's production - - for demonstration of maritime modes and development of a concept of operations for persistent, maritime ISR. The Navy also operates one Pioneer system and supports one Predator system for the United States Joint Forces Command's joint operational test bed system (JOTBS). Using these systems to examine UAV interoperability, the test bed enables such experimentation without competition for limited operational UAV assets and without Service doctrine or policy constraints. The Office of Naval Research is exploring development of a class of UAVs in between the size of the Shadow and small UAVs. UAVs in this class would provide significantly enhanced endurance over current electric powered systems and might provide similar capability to larger systems at much reduced cost. Competition is a strong motivator in this class, as much of the technology is commercial-off-the-shelf, with low barriers to entry. Creative options are emerging from a variety of innovative sources. For example, we have demonstrated endurance in excess of 16 hours with airframes that fit in the size of a golf bag. This represents an order of magnitude improvement of current operational small UAV capability.

The Marine Corps flies two UAV systems - - the tactical Pioneer and the small hand-launched Dragon Eye. Pioneer, operational since 1986, is the oldest UAV in the

inventory. Pioneer deployed to support the run to Baghdad last year where it flew over 700 sorties and accumulated 2300 flight hours. The Marine Corps plans to sustain the Pioneer for continued use through 2010. The Marine Corps competitively selected Dragon Eye in November 2003 for its small-unit reconnaissance capability. The first full rate production systems deliver in the spring of this year. Twenty prototype Dragon Eye systems were also deployed last year to support Marine Corps units in Operation IRAQI FREEDOM.

UAV-Related Advanced Concept Technology Demonstrations (ACTDs)

The Department is also demonstrating advanced UAV capabilities through the ACTD process. The Special Operations Command sponsored the Tactical Interferometric Synthetic Aperture Radar ACTD which showed the ability to map the earth with extremely high resolution. This ACTD will use an Air Force MQ-9 Predator B. Central Command and the Air Force sponsored the Hyperspectral Collection and Analysis System ACTD which will demonstrate detection, location, and identification of camouflaged and concealed targets. Other ACTDs in which UAVs play a significant role include Gridlock; Foliage Penetrating Synthetic Aperture Radar; Global Hawk Polarimetric Imaging; and the Adaptive Joint Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance Node.

DARPA Joint-Unmanned Combat Air System (J-UCAS) and Other Activities

Of particular significance, the Department this year redirected individual Service efforts into a joint unmanned combat air systems program. Formally established at the direction of OSD, the J-UCAS program is a joint Defense Advanced Research Projects Agency (DARPA), Air Force, and Navy effort to demonstrate the potential effectiveness of unmanned combat vehicles to suppress heavily defended enemy air defenses and to conduct ISR, electronic attack, and related strike missions. DARPA is leading this joint program effort with technical support from both Services. Their goal is to demonstrate capability that supports both Air Force and Navy emerging requirements. The joint system emphasizes more than just air vehicles. It will be based on a common open architecture and operating system, with air vehicles as subsystems that maximize system

flexibility and operational utility. This demonstration program includes a robust operational assessment planned to begin in 2007. The operational assessment will provide the Services with program options that could lead to an acquisition decision in the 2010 timeframe.

In addition to fixed wing UAV technology development, DARPA rotary wing development and demonstration efforts on UAV platforms lead the way in revolutionary applications of technology. The Unmanned Combat Armed Rotorcraft (UCAR) program is advancing the state-of-the-art in automation, collision avoidance, and signature control in a highly competitive development program. The A-160 Hummingbird technology effort is pushing to provide Predator-like endurance and payload in a rotary wing platform. Finally the canard rotor-wing (CRW) technology demonstration program is combining the attributes of both fixed and rotary wing technology in a single platform, promising both high speed and endurance with vertical take-off and landing capability. Some of the most innovative and revolutionary technology development activities in the aviation domain are now occurring on unmanned vehicles. This concludes my summary of the on-going Department efforts to acquire and demonstrated unmanned air systems.

OSD UAV-RELATED ACTIVITIES

I would now like to address our particular activities within the Office of the Secretary of Defense (OSD) to oversee the Services in acquiring UAV systems. Now about 2½ years old, the OSD-led UAV Planning Task Force works to guide the Services in their acquisition planning, prioritization, and execution of unmanned air system programs.

One year ago, the Task Force released its second edition of the DoD UAV Roadmap. The overarching goal of the roadmap is to define a logical, systematic migration of UAV mission capabilities to the Services. Unlike the first edition of the roadmap, which was descriptive in nature, the second edition is prescriptive in that it establishes goals for the Department to pursue as a means to achieve efficiencies and advance our unmanned capability. The roadmap identifies our “Top-10 Goals,” ranging from broad programmatic direction to very specific technology solutions, each aimed at a

critical technology, programmatic, or functional area of UAV transition. We have made significant progress on many of the identified goals which I will highlight.

- Our number one goal is to develop and operationally assess an unmanned combat air vehicle (UCAV) capability in the 2010 timeframe. UCAVs offer the potential to change the way military operations are conducted. We have consolidated funding into a defense-wide program element for efficiency, and we have established a Joint UCAS office that is leading the Department's efforts. We will demonstrate air vehicles from two different contractors during an operational assessment beginning in 2007. In 2010, we plan to make an acquisition decision for this new class of unmanned combat air vehicles.
- Another key goal is to develop and demonstrate a heavy fuel engine suitable for use in our tactical UAVs in 2005, and with growth potential to operate on larger UAVs in the Predator-class in 2007. A heavy fuel engine is one that can burn diesel or jet fuel. The Army is leading the effort toward this goal. They recently integrated a commercial heavy fuel engine into the Hunter UAV. Preliminary test data are promising: cruise fuel economy improved by 38 percent, takeoff roll improved by 6 percent, rate of climb improved by 20 percent, and electrical power increased by 100 percent. The use of heavy fuel not only improves performance but also reduces the logistics footprint and costs needed to support a special fuel type. DARPA and the Office of Naval Research are also experimenting with heavy fuel engine designs for several small UAV applications.
- Our top operational goal is to make it easier to safely fly UAVs in FAA-controlled airspace. To do so, we aim to revise FAA Order 7610.4 which will complement the Certificate of Authorization process currently used to operate UAVs in the National Air Space. The Air Force Flight Standards Agency is leading a working group that is developing a draft change to the FAA order which will allow UAV's with a qualified see-and-avoid system to "file-and-fly," similar to what is done routinely by general aviation. This will greatly improve flexibility and availability of many of our UAV systems. We expect the revision to be

complete early this summer. Once the FAA approves the revision, a flight demonstration next fall will validate the new procedures.

I hope that these examples give you an appreciation for the types of goals we are pursuing for our UAV programs. The roadmap has been very effective in communicating the Department's plan not only to Government organizations, but also to industry, inviting innovation and competition in this dynamic technology area. Although our goals are challenging, the Department is working hard to reach each of them. We are committed to maintaining the roadmap as a relevant and current DoD plan.

Finally, I would like to address our engagement with the Services on their UAV activities, which is an expansion of OSD's traditional oversight role. All of our acquisition activities fit within the Department's broader capability-based planning approach that responds to policy aims, considers warfighters' needs, finds systems solutions, and allocates resources efficiently. The USD(AT&L) has sufficient authority as the Defense Acquisition Executive to influence these processes and to provide the visibility and direction needed to advance UAV capabilities and effectively integrate them into the Combatant Commanders' operational forces.

Our resource allocation system, the Planning, Programming, Budgeting, and Execution (PPBE) process, affords OSD the means to adequately review and enforce UAV program activities across the Department. To cite two examples, we applied the PPBE process this year to adjust the Global Hawk and Joint Unmanned Air Combat System programs, allocating additional funding to those programs to maintain the momentum and direction needed to accelerate their development and fielding.

Another example of our expanded role is the Joint Small UAV Program Manager Working Group. This group, formed at OSD's recommendation, is made up of the program managers for each of the small UAV programs, representing each of the Services. It promotes the sharing of information, data, techniques, and technologies related to small UAVs. Recent successes include an Army, Marine Corps, and Special Operations Command combined buy of a small UAV infrared camera, saving 50 percent in unit costs.

In the area of capability needs, we work closely with the Joint Staff and the new Joint Capabilities Integration and Development System (JCIDS) process. This

capabilities-based process focuses on developing integrated joint warfighting capability, providing analysis of requirements and solutions across the Services. We are working with the Joint Staff and the Services to refine the JCIDS process within each of the established functional areas to better identify capability needs and define integrated solutions to meet those needs. This will lead to strategic plans or roadmaps for each functional capability area. UAVs will likely play an increasing role in meeting many of those needs, but in each case they will have to be integrated with our other diverse systems to provide effective war-fighting solutions.

Together, the Department's recently revised processes focus on building joint capability, promote the sharing of information, identify areas for cooperation, and make program adjustments to correct capability gaps and redundancies.

CONCLUSION

In summary, we believe the Department is making positive progress in developing and fielding UAVs. The wide array of capabilities offered by UAVs ranges from the very small hand-held systems, to emerging combat vehicles, to large, long endurance platforms. The Department envisions that unmanned technology will mature in its capability to support many mission areas and at every echelon of command. The rapid rate at which these capabilities can be developed and delivered to warfighters uniquely positions the United States to adapt to new and emerging threats.

Mr Chairman, this concludes my prepared remarks, I will entertain any questions you may have.

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ON ARMED SERVICES

STATEMENT BY

MAJOR GENERAL JAMES D. THURMAN

DIRECTOR, ARMY AVIATION TASK FORCE

OFFICE OF THE DEPUTY CHIEF OF STAFF, ARMY G-3

BEFORE THE HOUSE ARMED SERVICES COMMITTEE

TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

UNITED STATES HOUSE

ON US ARMY UNMANNED AERIAL VEHICLE (UAV) PROGRAMS

17 MARCH 2004

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MAJOR GENERAL JAMES D. THURMAN

DIRECTOR, ARMY AVIATION TASK FORCE

OFFICE OF THE DEPUTY CHIEF OF STAFF, ARMY G-3

CHAIRMAN WELDON, MR. ABERCROMBIE, AND DISTINGUISHED MEMBERS OF THE SUBCOMMITTEE, I AM PLEASED TO BE HERE TODAY TO DISCUSS THE ARMY'S PROGRESS IN OUR UNMANNED AERIAL VEHICLE, OR "UAV," PROGRAMS. I WELCOME THIS OPPORTUNITY TO TESTIFY BEFORE YOU AND APPRECIATE THE CONTINUED AND ONGOING SUPPORT AND GUIDANCE OF THIS COMMITTEE AS ARMY UAV'S MATURE AND EXPAND THEIR ROLE IN ENABLING THE JOINT FORCE.

SINCE THE START OF SUSTAINED COMBAT OPERATIONS FOR OPERATION IRAQI FREEDOM ONE YEAR AGO THIS WEEK, THE ARMY'S UAV CAPABILITIES HAVE EXPANDED SIGNIFICANTLY. ALTHOUGH IT WAS LIMITED AT THE OUTSET OF GROUND COMBAT OPERATIONS, ARMY UAV CAPABILITY IN THEATER HAS IMPROVED AND WILL CONTINUE TO DO SO OVER THIS YEAR. THE LESSONS LEARNED FROM

THAT FIGHT AND THE DAILY CHALLENGES OUR TROOPS FACE INDICATE THAT UAV'S ARE CRITICAL TO BOTH FORCE PROTECTION AND ENHANCING SITUATIONAL AWARENESS AND INTELLIGENCE GATHERING. DOCTOR LAMARTIN HAS GIVEN AN EXCELLENT OVERVIEW ON DOD UAV EFFORTS – I WOULD LIKE TO EXPAND ON THE ARMY'S UAV CONTRIBUTIONS AND THE AREAS WE SEE FOR IMPROVEMENT.

THERE HAVE BEEN MANY INSTANCES IN THE HISTORY OF WARFARE WHERE THE NECESSITIES OF BATTLE HAVE BECOME THE DRIVING FORCE OF THE DEVELOPMENT OF NEW TECHNOLOGIES, OR THE ADAPTATION AND REFINEMENT OF EXISTING TECHNOLOGIES FOR MILITARY PURPOSES. IN THIS CATEGORY, WE CAN INCLUDE SUCH INNOVATIONS AS THE GATLING GUN, THE TANK, RADAR, AIRPLANE, THE SUBMARINE, AND, MORE RECENTLY, THE HELICOPTER. SOMETIMES, WHEN THESE CAPABILITIES PROVIDE SUCH A STRATEGIC ADVANTAGE FOR ONE SIDE AT THE EXPENSE OF THE OTHER IT OFTENTIMES TIPS THE SCALE AND LEADS TO DECISIVE VICTORY. WE COMMONLY REFER TO THIS AS A REVOLUTION IN MILITARY AFFAIRS. CONCERNING UAV TECHNOLOGIES, RARELY A DAY GOES BY WITHOUT ANOTHER EMERGING DEVELOPMENT. I AM NOT CERTAIN THAT UAVS WILL USHER IN AN ERA OF REVOLUTION IN MILITARY AFFAIRS BUT THERE IS NO DOUBT THAT OUR RECENT AND ONGOING OPERATIONS IN

AFGHANISTAN AND IRAQ, COUPLED WITH OUR CONTINUING NEED TO DEFEND OUR HOMELAND FROM TERRORISTS WILL DRIVE THE DEVELOPMENT OF BOTH AIR AND GROUND UNMANNED PLATFORMS TO SUCH AN EXTENT THAT THEY WILL BECOME IMPORTANT, PERMANENT FIXTURES IN OUR ARMED FORCES. FROM WHAT WE HAVE SEEN WITH THE RECENT RAMPANT GROWTH OF UAV CAPABILITIES, THESE SYSTEMS ARE CERTAINLY COMING OF AGE AND HAVE GREAT POTENTIAL ON THE BATTLEFIELD NOW AND IN THE FUTURE.

THE FOCUS OF MY REMARKS TODAY WILL BE ON THE ARMY'S EXPERIENCE WITH UAV'S IN RECENT COMBAT OPERATIONS. I WILL COMMENT ON WHAT CAPABILITIES THESE SYSTEMS AFFORD OUR TROOPS AT VARYING ECHELONS OF COMMAND. I WILL ALSO DESCRIBE THE CHALLENGES WE'VE ENCOUNTERED ALONG THE WAY AS WELL AS OUR PLANS FOR THE FUTURE FORCE.

IN RECENT TESTIMONY TO THE HOUSE ARMED SERVICES COMMITTEE ON MARCH 4, I DESCRIBED THE RESULTS OF THE FOCUSED EFFORT OF ANALYSIS ON ARMY AVIATION THAT GENERAL SCHOOMAKER CHARGED ME TO LEAD. AS I'VE STATED PREVIOUSLY, THAT UNDERTAKING -- THE COMBINED EFFORT OF HUNDREDS OF THE ARMY AND INDUSTRIES "BEST AND BRIGHTEST" SUBJECT MATTER AVIATION EXPERTS OVER SEVERAL MONTHS OF DEDICATED ANALYSIS -- WAS

DESIGNED TO IDENTIFY AND CORRECT CHRONIC DEFICIENCIES IN ARMY AVIATION. ALTHOUGH MOST RECENTLY, THE ARMY'S DECISION TO TERMINATE THE COMANCHE PROGRAM HAS CAPTURED THE ATTENTION OF MANY – THAT AREA OF ANALYSIS WAS ONLY ONE OF A MYRIAD OF SUBJECTS EXPLORED BY OUR TASK FORCE. OUR APPROACH TOWARDS AVIATION WAS HOLISTIC AS WE EXAMINED VIRTUALLY EVERY FACET, INCLUDING UAVS. I CAN TELL YOU THAT IT IS THE ARMY'S INTENT TO DEDICATE A PART OF THE FUNDING GAINED FROM COMANCHE REPROGRAMMING TO UAVS – I'LL ADDRESS THIS IN MORE DETAIL LATER. ALTHOUGH MUCH OF THE DETAILED WORK REMAINS, IT PROVIDES THE BASIS FOR SUBSEQUENT EFFORTS.

IN PARALLEL WITH THE AVIATION FOCUS GROUP, THE ARMY RECENTLY COMPLETED A COMPREHENSIVE REVIEW ON THE CAPABILITIES OF OUR CURRENT UAVS AND IDENTIFIED UAV CAPABILITIES REQUIRED OF THE FUTURE FORCE. ADDITIONALLY, WITH THE HELP OF INDUSTRY EXPERTS, WE EXAMINED THE CAPABILITIES OF OUR SISTER SERVICES AND THOSE OF FOREIGN NATIONS AS WELL. THE UNITED STATES ARMY AVIATION CENTER AT FORT RUCKER SIMULTANEOUSLY COMPLETED A FUNCTIONAL AREA ASSESSMENT OF UAVS THAT EXAMINED EVERY FACET OF OUR INSTITUTIONAL APPROACH – DOCTRINE, TRAINING, LEADER DEVELOPMENT, ORGANIZATIONAL STRUCTURE, MAINTENANCE, SUSTAINMENT, PERSONNEL AND

FACILITIES – WE KNOW THERE ARE MANY CHALLENGES IN THESE AREAS TODAY AND I'LL COMMENT ON MANY OF THEM. THIS EFFORT ON THE FUNCTIONAL AREA ASSESSMENT FED INTO THE ARMY'S CAPABILITIES REVIEW ON UAV'S; BOTH EFFORTS WILL REINFORCE THE FOUNDATION FOR OUR OVERALL STRATEGY ESTABLISHED BY THE DOD UAV ROADMAP, PUBLISHED IN 2002 AND THE ARMY'S UAV ROADMAP IN MAY OF 2003– I'LL COMMENT SPECIFICALLY ON OUR FUTURE PLANS FOR UAV'S LATER IN THIS SESSION. LASTLY, AS YOU WOULD EXPECT, WE HAVE BEEN DIGESTING THE LESSONS LEARNED FROM OUR MOST RECENT COMBAT EXPERIENCES WITH UAV'S. THIS WORK CONTINUES WITH THE DEPLOYMENT OF AN ASSESSMENT TEAM OF UAV EXPERTS TO IRAQ AND AFGHANISTAN SCHEDULED TO OCCUR LATER THIS MONTH AND INTO APRIL. ALL OF THESE EXPERIENCES WILL BE INCORPORATED INTO OUR UAV REPORT TO CONGRESS, REQUIRED BY THE SENATE ARMED SERVICES COMMITTEE, WHICH IS EXPECTED TO BE COMPLETED IN APRIL.

WITH THAT AS THE FRAMEWORK FOR MY COMMENTS, I'D LIKE TO TURN NOW TO OUR EXPERIENCES WITH UAV'S IN OUR CURRENT OPERATIONS.

AT THE START OF COMBAT OPERATIONS IN IRAQ, OUR FORCES HAD INSUFFICIENT NUMBERS OF UAV'S. V CORPS HAD ONLY A SINGLE

HUNTER UAV SYSTEM – A SINGLE LAUNCH AND RECOVERY CAPABILITY WITH 8 AIRCRAFT -- WORKING OUT OF CAMP UDARI IN KUWAIT. IN SIMPLE TERMS, THIS CORPS, COMMANDED BY LIEUTENANT GENERAL WALLACE, HAD A SINGLE, CONTINUOUS EYE IN THE SKY. ON OCCASION, THEY BENEFITTED FROM DATA PROVIDED BY PREDATOR UAV; HOWEVER, PRIORITY FOR THAT MORE CAPABLE SYSTEM WAS NORMALLY PROVIDED TO A HIGHER HEADQUARTERS. OUR C-2, MAJOR GENERAL JIM MARTZ, DID AN EXCELLENT JOB MAKING SURE WE HAD COVERAGE FROM OTHER JOINT SYSTEMS WHEN THE CORPS NEEDED AUGMENTATION. FROM ITS BASE CAMP AT UDARI, HUNTER PROVIDED COVERAGE FOR THE CORPS UNTIL FORCES REACHED KARBALA. AT THAT POINT, V CORPS WAS FORCED TO SPLIT AND DISPLACE HUNTER ELEMENTS FORWARD TO KEEP PACE WITH THE GROUND FORCES AND MAINTAIN COVERAGE. TO DO THIS, V CORPS USED CHINOOK HELICOPTERS. ADDITIONALLY, ENGINEER SOLDIERS WERE REQUIRED TO PREPARE SUITABLE UAV RUNWAYS. DURING THIS TWO-DAY MOVEMENT, CONTINUOUS HUNTER COVERAGE WAS NOT POSSIBLE. FORTUNATELY, THIS COINCIDED WITH THE HORRIBLE DUST STORMS THAT SEVERELY RESTRICTED OUR MANEUVERS AND V CORPS TOOK ADVANTAGE OF THIS PAUSE TO POSITION THE UAV SYSTEMS FORWARD. SO AS YOU CAN TELL, UAV EMPLOYMENT REQUIRES VERY PRECISE PLANNING TO ENSURE THAT THE UAV BASELINE IS SUFFICIENT TO MEET THE MANEUVER COMMANDER'S REQUIREMENTS.

THE V CORPS COMMANDER PROVIDED HUNTER UNDER THE OPERATIONAL CONTROL OF DIVISIONS DURING CRITICAL PHASES OF THE OPERATION. FOR INSTANCE, DURING THE INITIAL ASSAULTS INTO BAGHDAD, THE 3RD INFANTRY DIVISION HAD THE ADVANTAGE OF CONTINUOUS SURVEILLANCE FROM HUNTER.

TYPICAL COMMENTS ABOUT UAV'S FROM SENIOR ARMY COMMANDERS DURING THE WAR INCLUDE THE FOLLOWING:

"UAV'S ARE EXTRAORDINARILY VALUABLE ASSETS, AND DEMAND LOTS OF TIME, ENERGY AND TRADEOFFS TO FULLY UNDERSTAND THEIR OPTIMAL EMPLOYMENT. UAV'S CAN BE USED FOR A VARIETY OF PURPOSES, BUT NOT NORMALLY FOR ALL PURPOSES SIMULTANEOUSLY. THE FEWER YOU HAVE THE TOUGHER THE CALLS, AND YOU WILL NEVER GET IT 100% RIGHT. UAV'S THAT ARE WED TO AIRFIELDS ARE VERY TOUGH FOR THE TACTICAL COMMANDER... ONE AIRCRAFT REQUIRES SECURITY, LAUNCH AND RECOVERY, ENGINEERS, LOG SUPPORT, ETC...THE MORE WE CAN SHED THE OVERHEAD AND MAKE THEM AIRFIELD INDEPENDENT THE MORE PRACTICAL THEY WILL BE TO USE. UAV'S REQUIRE A BATTLE RHYTHM SIMILAR TO MANNED AIRCRAFT... CREWS NEED REST OR THEY'LL MAKE MISTAKES, AND MISTAKES CAN DAMAGE OR DESTROY VALUABLE ASSETS. WE NEED TO FACTOR IN THE HUMAN

DIMENSION EVEN IF WE ARE TALKING ABOUT ROBOTS IN THE AIR. UAV'S ARE NOT THE SOLUTION TO OUR INTEL SHORTFALLS, THERE ARE MERELY ANOTHER TOOL TO GATHER INFORMATION ON THE BATTLEFIELD."

APART FROM THE EXPERIENCES OF THE V CORPS, ARMY SPECIAL OPERATIONS FORCES ALSO EMPLOYED AN OLDER SMALL UAV – THE POINTER SYSTEM, MANUFACTURED BY AEROVIRONMENT AS WELL AS THE PIONEER. U.S. MARINES EMPLOYED A SIMILAR SMALL UAV, THE DRAGON EYE.

PERMIT ME A FEW MINUTES TO DESCRIBE THE UAV SYSTEMS CURRENTLY AVAILABLE TO OUR SOLDIERS IN IRAQ AND AFGHANISTAN.

THE SMALLEST OF THE UAV FAMILY IN USE IS THE RAVEN WHICH, LIKE THE POINTER UAV, IS MANUFACTURED BY AEROVIRONMENT. IT REPRESENTS AN ACQUISITION SUCCESS STORY. IN A LITTLE MORE THAN ONE YEAR, THE ARMY UAV PROJECT MANAGER, IN CONCERT WITH THE RAPID EQUIPPING FORCE AND NATICK LABS, PUT TOGETHER A PROPOSAL FOR AN INITIAL BUY OF FIVE SMALL FIXED WING, BATTERY POWERED UAV SYSTEMS. AS A RESULT, THE RAVEN HAS BECOME THE SMALL UAV OF CHOICE FOR THE U.S. AIR FORCE AND

THE SPECIAL OPERATIONS COMMAND. THE ARMY HAS THE LEAD FOR A JOINT SERVICE SMALL UAV WORKING GROUP THAT HAS ALREADY REALIZED BENEFITS IN PAYLOAD COMPATABILITY AND COMMUNICATIONS. LIEUTENANT GENERAL CODY, THE ARMY G-3, SIGNED AN URGENT WARTIME REQUIREMENT FOR SMALL UAV'S FOR OPERATIONS IN IRAQ AND AFGHANISTAN, TOTALLING 185 SYSTEMS AND WE ARE IN THE PROCESS OF PROCURING THESE. TODAY, THE RAVEN HAS BEEN IN OPERATION FOR NEARLY SIX MONTHS. IN TOTAL, THERE ARE TEN RAVEN SYSTEMS IN OPERATION IN OPERATION ENDURING FREEDOM, OR OEF, AND OPERATION IRAQI FREEDROM, OR OIF. THE REMAINDER – 175 SYSTEMS – ARE EXPECTED TO BE COMPLETED BY THE END OF THIS CALENDAR YEAR. THIS WILL BE A SUFFICIENT NUMBER TO EQUIP EVERY DEPLOYED MANEUVER BATTALION. RAVENS FLY AT ABOUT ONE HUNDRED TO THREE HUNDRED FEET. IT IS INTENDED TO PROVIDE COMMANDERS A LOCAL OPERATIONAL AREA OBSERVATION TOOL.

OUR TACTICAL UAV, THE SHADOW SYSTEM – BUILT BY AAI CORPORATION – UNDERWENT THE ARMY'S FIRST UAV OPERATIONAL TEST IN APRIL 2002. TO DATE, THERE HAVE BEEN 24 SHADOW MODEL 200 SYSTEMS PROCURED. FIVE OF THESE ARE IN OPERATION IN IRAQ TODAY. THIS SYSTEM HAS ALSO BEEN FIELDDED TO STRYKER BRIGADES ONE AND TWO. THE SHADOW SYSTEMS GENERALLY

OPERATE AT AN ALTITUDE OF ABOUT SIX TO EIGHT THOUSAND FEET AT A TYPICAL MISSION RANGE OF ABOUT FIFTY KILOMETERS. FIELD EXPERIENCE INDICATES THAT SHADOW OFTEN EXCEEDED THIS CAPABILITY AND FLEW OUT TO 120 KILOMETERS. THE SHADOW FLEW OVER 2350 HOURS IN FISCAL YEAR 2003 AND HAS SURPASSED A TOTAL OF 4600 TOTAL HOURS IN OPERATION IRAQI FREEDOM TO DATE. IT ACHIEVED AN 83.3% READINESS RATE WITH NO COMBAT LOSSES. JUST THIS WEEK, THE SHADOW SYSTEM PASSED THE TEN THOUSAND HOUR MILESTONE. WHILE EXPERIENCING A 1.7 PER 1000 FLIGHT HOUR ACCIDENT RATE, THE TREND IS BEARING OUT SOLID IMPROVEMENTS DUE TO FOCUSED EFFORTS TO IMPROVE TRAINING, MAINTENANCE AND MATERIAL RELIABILITY. THIS IS AN EXCELLENT CAPABILITY.

THE IMPROVED-GNAT, OR "I-GNAT," IS A DOWNSIZED PREDATOR PROVIDED TO THE ARMY THROUGH A CONGRESSIONAL PLUS-UP. MANUFACTURED BY GENERAL ATOMICS, THE IGNAT WAS ORIGINALLY GOING TO BE FLOWN SOMEWHERE IN THE U.S. AS A MEANS FOR THE ARMY TO GAIN AN UNDERSTANDING OF THIS CLASS AND CAPABILITY AIRCRAFT. HOWEVER, OPERATIONS IN IRAQ PRE-EMPTED THIS PLAN – ONE SYSTEM OF THREE AIRCRAFT WILL BE DEPLOYED TO IRAQ THIS MONTH.

THE HUNTER, A SYSTEM MANUFACTURED BY NORTHROP GRUMMAN CORPORATION, WAS A JOINT PROGRAM TERMINATED IN 1996. FORTUNATELY, THE HUNTER REMAINED IN THE ARMY INVENTORY. IN THE FALL OF 2001, GENERAL KEANE DIRECTED THAT EACH ARMY CORPS BE EQUIPPED WITH ONE HUNTER SYSTEM. TODAY, THE U.S. ARMY HAS THREE SYSTEMS, ONE FOR EACH OF THE ARMY'S THIRD, FIFTH, AND THE EIGHTEENTH AIRBORNE CORPS. TWO OF THE HUNTER SYSTEMS WERE DEPLOYED – ONE IS CURRENTLY IN THEATER. THE HUNTER IS A UNIQUE UAV WITH TWO ENGINES, PROVIDING A GREATER DEGREE OF RELIABILITY. THESE SYSTEMS ROUTINELY FLY AT AN ALTITUDE OF EIGHT TO TWELVE THOUSAND FEET, AT A DISTANCE OF ABOUT 125 KILOMETERS. WITH ANOTHER PLATFORM ACTING AS A RELAY, RANGE FOR COMBAT OPERATIONS WAS EXTENDED BEYOND 200 KILOMETERS. IN 2003, THE TWO HUNTER UNITS CONDUCTED 4067 FLIGHT HOURS WHILE MAINTAINING AN OVERALL SYSTEM READINESS RATE OF 82 PERCENT WITH AN ACCIDENT RATE OF 0.93 PER 1000 FLIGHT HOURS. SEVEN HUNTER AIR VEHICLES WERE LOST CONDUCTING COMBAT OPERATIONS

OUR DATA SHOWS THAT HUNTER AND SHADOW SYSTEMS ARE OPERATING AT ABOUT SIX TIMES THEIR TRAINING OPTEMPO. THIS TRANSLATES TO ABOUT THREE HUNDRED HOURS PER PLATOON PER MONTH INSTEAD OF THE TRAINING OPTEMPO OF FIFTY HOURS PER

MONTH. UNITS HAVE BEEN MANNED BETWEEN NINETY AND ONE HUNDRED-PER CENT. EVEN SO, UNITS ARE HARD PRESSED TO MAINTAIN TWENTY-FOUR HOUR OPERATIONS, AND THE SYSTEMS GENERALLY OPERATE ABOUT EIGHTEEN HOURS PER DAY.

IN CURRENT OPERATIONS, SHADOW AND HUNTER PROVIDE CONVOY COVERAGE, ROUTE RECONNAISSANCE, BATTLE DAMAGE ASSESSMENT, PERSISTENT OVERWATCH AND AIRFIELD SURVEILLANCE. THE SYSTEMS ARE TIGHTLY INTEGRATED WITH AVIATION, ARTILLERY AND GROUND MANEUVER OPERATIONS. NORMALLY THE DIVISION COMMANDER ALLOCATES THEIR USE DIRECTLY. THE GOAL IS TO PROVIDE WHAT WE REFER TO AS "ACTIONABLE INTELLIGENCE." THESE SYSTEMS ARE ASSIGNED TO INTELLIGENCE BATTALIONS AND OPERATED EXCLUSIVELY BY SPECIALISTS SUPPLEMENTED WITH CONTRACTED LOGISTICS SUPPORT.

IN ADDITION TO SOME OF THE CHALLENGES DESCRIBED PREVIOUSLY, COMMANDERS WERE ALSO CHALLENGED IN FREQUENCY MANAGEMENT AND BANDWIDTH. HUNTER AND PIONEER USED THE SAME FREQUENCIES FOR BOTH UPLINK – WHICH PROVIDED PLATFORM CONTROL – AND DOWNLINK – WHICH PROVIDED VIDEO. COMMANDERS WERE FORCED TO DE-CONFLICT THE FREQUENCIES PRIOR TO COMBAT

OPERATIONS. ALSO, AIRSPACE DE-CONFLICTION WAS, AND IS ALWAYS, A CONSIDERATION. AS THE NUMBER OF UAVS CONTINUE TO GROW, AIRSPACE DECONFLICTION BECOMES INCREASINGLY IMPORTANT, PARTICULARLY FOR ARMY HELICOPTERS – THAT ROUTINELY OPERATE IN THE SAME ENVIRONMENT.

ALTHOUGH OUR ATTENTION IS FOCUSED ON CURRENT OPERATIONS, WE MUST KEEP AN EYE ON THE FUTURE. TOWARDS THAT END, A SUBSTANTIAL AMOUNT OF WORK HAS BEEN DONE.

UAV'S WILL BE AN ESSENTIAL PART OF THE ARMY'S FUTURE SYSTEM OF SYSTEMS ENVIRONMENT. AS PART OF THAT ARCHITECTURE, THE ARMY ENVISIONS FOUR CLASSES OF UNMANNED AERIAL VEHICLES, STARTING WITH CLASS I AT THE PLATOON LEVEL AND ENDING WITH CLASS IV AT THE UNIT OF ACTION, "UA," OR BRIGADE. YOU ARE UNDOUBTEDLY AWARE THAT THE FCS SOURCE SELECTION PROCESS CHOSE THE "FIRESOULT" AS THE CLASS IV SYSTEM. THIS PARTICULAR UAV HAS FEATURES THAT MAKES IT A GOOD COMPANION FOR ARMY HELICOPTERS. THE ARMY IS PARTICULARLY EXCITED ABOUT THIS PLATFORM, AS THE UNITED STATES NAVY HAS ALSO SELECTED IT FOR USE. IT HAD BEEN THE ARMY'S INTENTION TO POSITION THIS AIRCRAFT WITH THE COMANCHE IN THE RECONNAISSANCE SQUADRON OF THE FCS-EQUIPPED UNIT OF

ACTION. HOWEVER, AS A RESULT OF OUR ANALYSIS IN THE AVIATION FOCUS GROUP, WE RECOMMENDED THAT – AT LEAST FOR THE FORESEEABLE FUTURE – AVIATION BE CONSOLIDATED AT THE DIVISION, OR UNIT OF EMPLOYMENT, OR “UE” LEVEL OF ORGANIZATION. WITH THAT, AND THE DECISION TO TERMINATE THE COMANCHE PROGRAM, THE MANNED-UNMANNED TEAMING OF UAV’S WITH ARMY HELICOPTERS IS NOW EXPECTED TO OCCUR IN THE AVIATION UNIT OF ACTION. WE MAY ALSO USE THE FIRESOULT TO SATISFY CLASS III, OR BATTALION, REQUIREMENTS. TO GAIN EFFICIENCIES THE ARMY MAY CONSOLIDATE ALL OF THESE AT THE AVIATION UA AND PROVIDE SUPPORT TO FCS-EQUIPPED UNITS OF ACTION, BRIGADES OR BATTALIONS, FROM THAT UNIT. IN THE MID-TERM, HOWEVER, UNTIL THE TECHNOLOGIES ARE SUFFICIENTLY MATURE TO PRODUCE THE MINIMUM CAPABILITIES REQUIRED OF THE 1ST INCREMENT OF THE FCS, THE ARMY INTENDS TO CONTINUE WITH THE SHADOW UAV. IN FACT, THE ARMY INTENDS TO RESOURCE AN ACCELERATED, LIMITED PRODUCT IMPROVEMENT PROGRAM FOR THE SHADOW WITH SOME OF THE FUNDS REPROGRAMMED FROM COMANCHE.

IN THE CATEGORY OF SMALL UAV’S, THE ARMY INTENDS TO INVEST SOME FUNDING FOR ADDITIONAL SMALL UAV SYSTEMS IN THE NEAR-TERM, THEN IN THE MID-TERM, MOVE TOWARDS A JOINT SMALL OR

MICRO UNMANNED AERIAL VEHICLE – CURRENTLY IN DEVELOPMENT BY DARPA. ALTHOUGH THE ARMY MADE A DECISION RECENTLY TO INCREASE QUANTITIES OF RAVEN SYSTEMS, WE CONTINUE TO CONSIDER OTHER SOLUTIONS TO SATISFY OUR SMALL UAV REQUIREMENT.

AT THE HIGH END, FOR USE BY OUR DIVISIONS OR CORPS FORMATIONS, THE ARMY WILL CONTINUE TO INVEST IN THE HUNTER PROGRAM AND, SIMULTANEOUSLY, MOVE TOWARDS AN EXTENDED RANGE / MULTI-PURPOSE, OR “ER/MP” SOLUTION IN THE MID-TO-FAR TERM. COMANCHE REPROGRAMMING PROVIDES SOME FUNDING FOR BOTH OF THESE INITIATIVES.

WHILE REQUIRED FUTURE CAPABILITIES ARE UNIQUE FOR EACH CLASS OF UAV, THEY SHARE SOME COMMON FEATURES. THE ARMY IS JUSTIFYABLY PROUD OF COMPLETING THE JOINT INTEROPERABILITY CERTIFICATION OF ITS UAV GROUND CONTROL STATION. WE INTEND TO USE THIS GROUND CONTROL STATION AS THE BASIS FOR THE SHADOW, HUNTER, I-GNAT, AND EXTENDED RANGE / MULTI-PURPOSE UAV SYSTEMS. THIS ENABLES COMMONALITY IN TRAINING, LOGISTICS, COMMUNICATIONS, SOFTWARE AND OPERATIONS FOR THESE SYSTEMS. UAV’S OF THE FUTURE WILL SHARE A COMMON DATA LINK TO FACILITATE INTEROPERABILITY, OFFER GREATER DEGREES OF

RELIABILITY AND SIMPLICITY OF MAINTENANCE AND TRAINING NOT FOUND IN SYSTEMS OF TODAY. THE ARMY ALSO INTENDS TO MOVE TO HEAVY FUEL ENGINES WHERE POSSIBLE TO HAVE ONE STANDARD FUEL ON THE BATTLEFIELD. UAV SYSTEMS THAT DIRECTLY OPERATE OR SUPPORT THE FCS UNITS OF ACTION (UA) MUST BE EASILY DEPLOYED AND HAVE AN ABILITY TO LAUNCH AND RECOVER FROM FIELD LOCATIONS. THEIR NETWORK ARCHITECTURE MUST FACILITATE PLUG-AND-PLAY CONFIGURATIONS FOR THE MISSION EQUIPMENT PACKAGES, OR "MEP'S." THE MEPS THEMSELVES MUST BE SMALLER AND LIGHTER TO KEEP THE AIR PLATFORMS SMALL AND MORE SURVIVABLE. OF COURSE, THEY MUST BE AFFORDABLE ALTERNATIVES TO MANNED PLATFORMS. THESE REQUIREMENTS REPRESENT A TALL ORDER – HIGH EXPECTATIONS – MOST OF WHICH ARE BEYOND CURRENT TECHNOLOGIES.

TWO OF THE MORE EXCITING SCIENCE AND TECHNOLOGY PROJECTS THAT WE ARE INTERESTED IN DEVELOPING ARE THAT OF THE A-160 HUMMINGBIRD AND THE UNMANNED COMBAT ARMED ROTORCRAFT, OR "UCAR." WHILE THE ARMY HAS NOT SETTLED ON A SPECIFIC SYSTEM, LIKE THE ER/MP OR FIRE SCOUT, THESE TWO S&T PROJECTS OFFER MANY OF THE CAPABILITIES REQUIRED OF UAVS IN THE FUTURE FORCE.

WHILE WE BELIEVE THAT AERIAL INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE, OR "ISR" WILL CONTINUE AS A CORE MISSION OF UAV'S, THE ANALYSIS OF THE RECENTLY CONCLUDED ARMY CAPABILITIES REVIEW FOR UAV'S SUGGESTS TWO OTHER CORE MISSIONS: AERIAL ARMED ATTACK AND COMMUNICATIONS RELAY. IN THE CORE MISSION AREA OF ISR, WE BELIEVE UAV'S WILL CONTINUE TO PROVIDE A CRITICAL SOURCE OF INFORMATION IN THE FORM OF IMAGERY AND SIGNAL INTELLIGENCE FOR BOTH ARMY AND JOINT NEEDS. ADDITIONALLY, UAV'S WILL ALSO PROVIDE AIRBORNE STANDOFF MINE DETECTION OR CHANGE DETECTION, AS WELL AS DETECTION OF CHEMICAL, BIOLOGICAL OR RADIOLOGICAL HAZARDS, AND RAPID MEDICAL RESUPPLY. IT WAS ONLY COMMON SENSE TO SHIFT THESE REQUIRED CAPABILITIES TO UNMANNED PLATFORMS AS MUCH AS POSSIBLE.

IN THE ISR AREA, THE ARMY BELIEVES UAVS MUST HAVE A HIGH DEGREE OF TARGETTING PRECISION ACCURACY, MADE POSSIBLE WITH A VARIETY OF SENSOR PACKAGES -- THE ARMY HAS ALREADY FUNDED THE RESEARCH AND DEVELOPMENT TO ACHIEVE A TEN METER TARGET LOCATION ERROR LEVEL OF ACCURACY ON THE SHADOW SYSTEM. FOR THIS MISSION AREA, UAVS MAY LOITER FOR EXTENDED PERIODS, EXECUTING WHAT WE REFER TO AS "PERSISTENT STARE." IN DOING SO, WE INTEND TO KEEP CRITICAL AREAS OF

INTEREST UNDER CONSTANT SURVEILLANCE. THE ADVANTAGES OF POSSESSING THIS CAPABILITY, WHETHER IN IRAQ, AFGHANISTAN OR, FOR THAT MATTER, ALONG OUR BORDERS OR PORTS, WITHIN THE LIMITS OF OUR AUTHORITIES... MAY ALSO HAVE IMPLICATIONS FOR CIVILIAN AUTHORITIES FOR HOMELAND DEFENSE AND SECURITY.

IN THE CORE MISSION AREA OF AERIAL ARMED ATTACK, THE ARMY INTENDS TO DEVELOP THIS CAPABILITY THROUGH BOTH MANNED AND UNMANNED TEAMING WITH OTHER AVIATION SYSTEMS – AS THE ARMY BELIEVES IT IS IMPERATIVE TO KEEP THE “MAN IN THE LOOP” – OR, ALTERNATIVELY, THROUGH SELF-LAUNCHED MUNITIONS ENGAGEMENT FOR THOSE OCCASIONS WHERE A STRATEGICALLY OR OPERATIONALLY-IMPORTANT TARGET OF OPPORTUNITY PRESENTS ITSELF. THE ARMY HAS ALREADY DEMONSTRATED AN ARMED UAV CAPABILITY WITH THE LAUNCH OF A BRILLIANT ANTI-TANK, OR “BAT,” MUNITION FROM A HUNTER PLATFORM, REFERED TO AS A “VIPER STRIKE” -- THE ARMY G-3 RECENTLY APPROVED IT’S OPERATIONAL NEEDS STATEMENT. THE ARMY WILL LEVERAGE THIS EXPERIENCE AND CONTINUE TO DEVELOP THIS WEAPONIZATION CAPABILITY NOT ONLY FOR THE HUNTER, BUT ALSO FOR THE ER/MP UAV.

IN ADDITION TO PROVIDING FUNDS FOR THE SHADOW AND HUNTER PROGRAMS AS MENTIONED PREVIOUSLY, THE ARMY ALSO INTENDS TO

DEVELOP A LEVEL-4 UAV CONTROL AS PART OF THE NEXT GENERATION LONGBOW APACHE, WHICH WE REFER TO AS "LONGBOW BLOCK III." IN FACT, FOR THE LAST TWO YEARS THE ARMY HAS EXPERIMENTED WITH THIS CAPABILITY BETWEEN UAV'S AND LONGBOW APACHES IN THE FORM OF AN ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION – A JOINT PROGRAM KNOWN AS THE HUNTER STANDOFF KILLER TEAM, OR "HSKT," THAT WE SHARE WITH THE NAVY. THE BLOCK THREE PROGRAM WAS PRESENTED YESTERDAY (16 MARCH) TO AN ARMY REQUIREMENTS OVERSIGHT COUNCIL FOR CONSIDERATION.

FOR SELF-LAUNCH, UAV'S MUST POSSESS ACCEPTABLE TARGET LOCATION ACCURACY AND A LEVEL OF SOPHISTICATION NOT CURRENTLY AVAILABLE IN SMALL OR TACTICAL UAV'S. SIMILARLY, THE ARMY IS EXCITED ABOUT DEVELOPING A MINE DETECTION OR CHANGE DETECTION CAPABILITY TO FOIL TERRORISTS ABILITY TO EMPLOY IED'S, OR "IMPROVISED EXPLOSIVE DEVICES" AGAINST OUR SOLDIERS AND CIVILIANS.

LASTLY, UAV'S ARE THE LOGICAL CHOICE TO PROVIDE A COMMUNICATIONS RELAY PACKAGE, OR "CRP" WHEN REQUIRED. THE ARMY IS EXPLORING OPTIONS IN CRP PACKAGING AND PLATFORMS. AS A SCIENCE & TECHNOLOGY INITIATIVE, THE ARMY IS CONSIDERING

SUCH OPTIONS AS HIGH ALTITUDE AIRSHIPS OR "HAA'S" THAT WOULD LOITER AT HIGH ALTITUDES FOR EXTENDED PERIODS OF TIME -- SUFFICIENTLY LARGE ENOUGH TO CARRY HEAVIER CRP'S ALOFT. THESE WOULD PROVIDE THE FOUNDATION OF A ROBUST NETWORK CAPABILITY, REINFORCED WITH CRP'S CARRIED IN SMALLER UAV'S TO BROADCAST DATA WITHIN THEATER AREAS. WE BELIEVE THIS CAPABILITY IS ESSENTIAL IN ORDER TO GAIN AND SHARE THE COMMON RELEVANT OPERATING PICTURE NECESSARY TO FIGHT AND WIN IN THE FUTURE ENVIRONMENT.

OBVIOUSLY, THESE CAPABILITIES ARE NOT CURRENTLY AVAILABLE TO US. THE CHALLENGES OF DEVELOPING THEM ARE AHEAD OF US, BUT I WANTED TO PROVIDE YOU A GLIMPSE OF WHAT CAPABILITIES THE ARMY ENVISIONS FOR THESE UNMANNED SYSTEMS.

TO FACILITATE THE TRANSFORMATION OF OUR AVIATION FORCES AND ENABLE DEVELOPMENT OF THESE FUTURE CAPABILITIES AND CONCEPTS, THE ARMY RECENTLY MADE SEVERAL DECISIONS ABOUT OUR ORGANIZATIONS AND PROPONCENCIES. I AM CERTAIN THAT YOU ARE AWARE THAT ACQUISITION OF ALL ARMY UAV SYSTEMS HAS BEEN CENTRALIZED AT HUNTSVILLE, ALABAMA WITHIN THE AVIATION PROGRAM EXECUTIVE OFFICE. YOU MAY ALSO BE AWARE THAT THE ARMY HAS MOVED DOCTRINAL PROPONENCY OF UAV'S FROM OUR

INTELLIGENCE CENTER AT FORT HUACHUCA, ARIZONA TO THE ARMY'S AVIATION CENTER AT FORT RUCKER, ALABAMA. SIMILARLY, THE DEPARTMENT INTENDS TO MOVE UAV MANAGEMENT – FOR PLATFORM INTEGRATION – TO OUR AVIATION SECTION THAT CURRENTLY MANAGES ALL BUT A VERY SMALL PART OF THE ARMY'S ROTARY AND FIXED WING AIRCRAFT. THIS IS NOT TO SAY THAT THE INTELLIGENCE CENTER WILL NO LONGER PLAY AN IMPORTANT ROLE IN INTELLIGENCE DOCTRINE DEVELOPMENT OR UAV TRAINING OF INTEL UAV SPECIALISTS. MANAGEMENT OF SPECIALIZED PAYLOADS, OR MISSION EQUIPMENT PACKAGES, WILL REMAIN WHERE THEY ARE TODAY.

HOWEVER, THE ORGANIZATION ADJUSTMENTS WE ARE MAKING REPRESENT THE ARMY'S BELIEF THAT UAV'S AND THEIR MISSIONS BEST COMPLEMENT THOSE OF MANNED PLATFORMS IN ARMY AVIATION. TO THE ARMY, THERE IS A NATURAL AFFINITY FOR THESE TWO CLASSES OF AERIAL SYSTEMS AND OUR EXPECTATIONS FOR DIVIDENDS WE INTEND TO REALIZE FROM THE SYNERGIES ARE GREAT.

HAVING SAID THAT, WHILE WE'VE MADE CONSIDERABLE GAINS IN THE RECENT PAST IN THE AREA OF UAV DEVELOPMENT AND IN DEFINING THE PATH WE WILL TAKE, WE ARE CERTAINLY A LONG WAY FROM SOLVING ALL OF OUR CHALLENGES, AND WE ARE NOT MOVING FORWARD IN A VACUUM. WE CONTINUE TO SOLICIT INDUSTRY AND

WORK WITH OUR SISTER SERVICES IN BOTH FORMAL – SUCH AS THE ARMY / MARINE CORPS BOARD AND THE JOINT CAPABILITIES INTEGRATION AND DEVELOPMENT SYSTEM AND INFORMAL SETTINGS – FOR THE BEST POSSIBLE SOLUTIONS.

IN CLOSING, OUR COMMON GOAL IS TO PROVIDE THE BEST POSSIBLE CAPABILITY FOR OUR SOLDIERS IN HARMS WAY. I KNOW THAT YOU WILL AGREE WITH ME THAT THESE YOUNG MEN AND WOMEN DESERVE NOTHING LESS. IN MANY WAYS, UAV'S ARE STILL IN THEIR INFANCY IN DEVELOPMENT. THESE SYSTEMS REPRESENT TREMENDOUS POTENTIAL AND ALMOST LIMITLESS POSSIBILITIES FOR THE FUTURE. FEEDBACK FROM ALL ECHELONS OF COMMAND – PLATOONS TO COMBAT COMMANDERS – TELLS US THAT UAV'S ARE HERE TO STAY.

OUR GOAL IS TO INVEST IN THESE SYSTEMS AND QUICKLY DEVELOP THEIR POTENTIAL APPLICATION IN MILITARY MATTERS TO SECURE, AND THEN MAINTAIN, THIS AS A STRATEGIC ADVANTAGE FOR OUR ARMED FORCES. ON THEIR BEHALF, I SINCERELY APPRECIATE YOUR INTEREST AND INVOLVEMENT IN THIS AREA. THANK YOU FOR ALLOWING ME THE OPPORTUNITY TO ADDRESS YOU IN THIS FORUM AND WE SINCERELY APPRECIATE YOUR RESOLUTE SUPPORT TO OUR GREATEST ASSETS, AMERICANS SONS AND DAUGHTERS – OUR SOLDIERS.

I WOULD BE HAPPY NOW TO ADDRESS ANY QUESTIONS YOU MAY HAVE.

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COMMITTEE ON ARMED SERVICES
UNITED STATES HOUSE OF REPRESENTATIVES

TESTIMONY OF

LIEUTENANT GENERAL WALTER E. BUCHANAN III
COMMANDER, UNITED STATES CENTRAL COMMAND AIR FORCES
COMMANDER, NINTH AIR FORCE

BEFORE THE UNITED STATES
HOUSE ARMED SERVICES COMMITTEE
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES

17 MARCH 2004

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COMMITTEE ON ARMED SERVICES
UNITED STATES HOUSE OF REPRESENTATIVES

**Statement of the Commander, United States Central Command Air Forces
And Commander, Ninth Air Force
House Armed Services Committee
Tactical Air and Land Forces Subcommittee
17 March 2004**

Chairman Weldon, Congressman Abercrombie, and distinguished members of the committee, thank you for this opportunity to present the war fighter's viewpoint on the use of Unmanned Aerial Vehicles (UAVs) in support of military operations in Afghanistan and Iraq.

As the commander of United States Central Command Air Forces (CENTAF) and Gen Abizaid's Combined Forces Air Component Commander (CFACC), I am intimately familiar with the contributions and limitations of our UAV force in support of our operations in Afghanistan and Iraq. As we speak, UAVs are loitering over hostile territory gathering intelligence and tracking targets in support of our ground forces and operations in Iraq and Afghanistan.

From my early days as the last Joint Task Force-Southwest Asia (JTF-SWA) Commander and Gen Moseley's deputy forward in the United States Central Command (CENTCOM) area of operations, I have seen a significant evolution in the employment of our operational UAV force. It has been only because of the outstanding support and attention from members of Congress that we have been able to evolve our UAV force from one that was principally an intelligence collections platform in Bosnia to one that today has a very potent air to ground capability. Congress continues to support us by placing emphasis on spare parts, maintenance and munitions stockpiles. It is because of your assistance that we remain the most highly trained and capable Air Force in the world. Throughout my time in the CENTCOM area of operations, I cannot tell you how extremely proud I am to work alongside the men and women from all services and our coalition partners, supporting the best Soldiers, Sailors, Airmen, and Marines in the world.

UAV OVERVIEW

As the CFACC for CENTCOM, I have control and direction over aircraft, including UAVs, across the Area of Responsibility (AOR) operating at the operational level – that is, air platforms that provide direct support to the Combined Joint Task Force (CJTF) commanders. UAVs with less range, compared to the Predator, are operated and directed at the tactical level. As you are well aware, more than ten different types of UAVs are currently employed in theater, from tactical systems such as the

US Army's Hunter and USAF's Desert Hawk to operational systems able to range the full depth and breadth of the battlespace such as the USAF's Predator and Global Hawk. Doctrinally, CENTCOM employs UAVs in a layered approach across the battlefield with shorter range, tactical systems in direct support of deployed units while more flexible, longer range systems are used to range the theater in general support responding to priorities set by CENTCOM and the supported joint task force commanders. As the tactical UAV's are not normally under my control either as the CFACC or Commander of Air Force Forces, I will focus my remarks at the operational level except for the one small UAV which I do control, which is the USAF's Force Protection Airborne Surveillance System (FPASS), Desert Hawk. I will then move to the operational level and discuss the RQ and MQ-1 Predator and the Global Hawk.

The FPASS/Desert Hawk provides real-time overhead imagery to detect and assess standoff weapons threats, including MANPADs. We currently have it deployed in both Afghanistan and Iraq with USAF security forces (SF) assigned air base ground defense (ABGD) duties. It is a small aircraft that is launched via a bungee cord catapult and glides to a landing when the mission is over. It's powered by rechargeable batteries for one to two hours of flight time within a range of six miles of the operator. It flies 35 to 50 miles per hour at altitudes from 200 to 500 feet above ground level and can be directed by an operator on the ground or fly a preplanned flight plan. Our SF troops are currently using the Desert Hawk's electro-optical and infrared sensors to provide them "eyes" outside the fence line around bases in the AOR. This extended look is helping us leverage air base ground defense assets in both Afghanistan and Iraq. It is an asset whose capability can truly be leveraged when we partner the Desert Hawk with our many other ABGD assets such as the Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS), Tactical Automated Security System (TASS), and Army counter battery radars, to name just a few.

Probably our most well known UAV system operating in the CENTCOM AOR is the RQ/MQ-1 Predator. Predator aircraft are medium-altitude, long-endurance UAVs that I employ across both theaters in direct support of CENTCOM and joint task force commander priority missions. As you know, the RQ-1 or reconnaissance version is the earliest version of the Predator. The Air Force is no longer procuring these and instead are acquiring the more capable MQ-1s, and sending our remaining RQ-1s to Depot to be retrofit into the MQ-1 models. The MQ-1 combines a more capable sensor ball with the ability to carry and employ two Hellfire laser guided missiles. The basic Predator crew consists of a pilot and sensor operator. They fly the aircraft from inside the Ground Control Station (GCS) via a C-Band line-of-sight data link or a Ku-Band satellite data link for beyond line-of-sight

flight. It has a color nose camera, a variable aperture electro-optical camera, a variable aperture infrared camera and synthetic aperture radar for looking through smoke, clouds or haze. That said, the biggest mission capability that the Predator provides is its full-motion video (FMV) that can be streamed to the supported commander, other aircraft, and even to the Terminal Air Controller on the ground. As such, it is very valuable when long loiter surveillance or target-tracking is required.

In both Afghanistan and Iraq, the Predator system is being used to assist the ground commander in a number of missions. One of the most visible is its use in the hunting and targeting of high value targets (HVT). The Predator gives the commander a persistent long loiter capability in order to keep suspected HVT hide-sites under constant surveillance. Such coverage assists the ground commander in planning their attack. Avenues of approach and terrain can be evaluated and studied right up until the time of the attack without tipping off the enemy that they are under surveillance. During an assault the Predator can provide positive identification and target tracking, and help ensure collateral damage criteria are met. Of note, Predator was directly overhead providing similar coverage when Saddam Hussein was captured.

Predator is also used in its more conventional intelligence gathering role as it responds to the requirements of CENTCOM and JTF collection managers. These requirements are forwarded to my air component headquarters or Combined Air Operations Center (CAOC) in Qatar. There we incorporate collection requirements into the air tasking order to be filled by the most appropriate platform. In some cases this is a manned system such as British GR-4 or US F-16 with a reconnaissance pod, a U-2, or possibly a Predator.

The Predator system is also used to coordinate attacks for other strike aircraft, or even in the direct attack role employing its Hellfire missiles. In this role, it is a very discriminating attack platform with very lethal but low collateral damage weapons. As such, it is very useful in tracking, targeting and engaging targets in built up areas where the commander is concerned about collateral damage and non-combatant injuries.

Another operational level UAV is the Global Hawk which provides near-real-time, high resolution, intelligence, surveillance and reconnaissance imagery across the battle space as well. The Global Hawk cruises at extremely high altitudes and can survey large geographic areas with pinpoint accuracy, providing us up-to-date information on enemy locations, resources and personnel, which can be supplied to ground commanders or used to target the enemy with available air assets. It has an electro optical-infrared sensor and synthetic aperture radar with a ground and moving target indicator

which made it very effective during the dust storms that limited visibility during the march north to Baghdad in Operation IRAQI FREEDOM.

UNMANNED AERIAL VEHICLES – OEF

On October 7, 2001, UAVs were used to highlight targets as we kicked off Operation ENDURING FREEDOM in Afghanistan. From moment one, the UAV was employed to provide the ground commander with information and imagery that allowed forces on the ground to move swiftly and accomplish their mission. As of today we've been conducting combat operations in Afghanistan for the last 892 days. The platform has proven to be an invaluable asset to the war fighter and has been instrumental in transforming how we think about UAVs within the Air Force and how the Combatant Commander can use them in his arsenal of weapons. With its outstanding loiter time, Predators have been able to establish a nearly continuous presence overhead the battlefield providing the commander real-time imagery and full-motion video of combat operations as the battle shifted from house to house, hut to hut, and cave to cave. UAVs have been critical in our efforts to track remaining Taliban operatives, and in assisting coalition ground forces during their raids to rout out the Taliban and al Qaida enemy forces.

As you are aware, our operations in Afghanistan are ongoing. There are still pockets of the Taliban harassing innocent Afghani citizens and attacking U.S., NATO and coalition troops, as well as humanitarian aid workers and others assisting in the reconstruction of Afghanistan. We routinely monitor the central regions of Afghanistan with every platform we can bring to bear, including the Predator, U2, JSTARS, national systems, and manned aircraft such as A-10 fighters equipped with LITENING electro-optical and infrared sensor pods.

SOUTHERN WATCH TO IRAQI FREEDOM

Even before Afghanistan, we have been heavily engaged in Iraq. For more than 10 years coalition partners flew thousands of sorties patrolling the Southern No Fly Zone. During this time, UAVs were used as a part of the team, but the way we employed them was as a stand-alone platform. At that time, we only flew the reconnaissance RQ-1 version of the Predator. Our fighters, bombers, tankers and other intelligence gathering assets flew as an integrated package while our Predators and other UAVs operated independently. Over time, we began to integrate our UAV forces into our flight packages. By the time we were ready to conduct Iraqi Freedom operations, our Predators were considered not only a valuable part of our integrated strike packages but our bravest wingman as well.

During my time as the JTF-SWA commander, I saw the Predators used not only in their traditional reconnaissance role, but also in their direct attack and forward air controller role as we prosecuted time sensitive targets. They were invaluable in finding and tracking dynamic, moving targets and provided us last minute, real time targeting data that we might otherwise not have had. Predators and other intelligence platforms again showed their value as they enabled us to destroy critical information and command and control nodes prior to IRAQI FREEDOM. As we expanded the mission capabilities of UAV's, we've witnessed the evolution to using them armed with missiles as air-to-ground platforms and even with a limited air-to-air self-defense capability.

Prior to launching the first weapons to rid Iraq of Saddam Hussein, Predators flew above Baghdad gathering data, monitoring HVTs and providing us real-time intelligence information.

Our UAVs leveraged the ability of other Air Force assets to attack key Iraqi command and control facilities and leadership targets. As General Moseley said, we were the hammer to the ground forces anvil. As the ground component marched toward Baghdad, our UAV force provided critical real-time targeting data to air and ground commanders, allowing Coalition Air Forces to lay waste to sizable units in the way of our ground forces, insuring an expeditious march to the capital. We were simultaneously destroying fielded forces, command and control centers, supporting our special operations forces and ensuring that we gained and maintained air superiority and supremacy. We were successful in meeting and surpassing our goals, and 21 days later Baghdad fell into Coalition hands. Five days later the last of the remaining holdout cities capitulated.

Today is day 364 of continuous combat in Iraq. During the last year we have witnessed many insurgents operating in Iraq, placing improvised exploding devices, firing mortars and attacking coalition troops on the ground. Using the Predator we've been able to thwart several attacks. On December 29, 2003, Forward Operating Base St. Mere came under mortar attack. The 3rd BCT Fire Support Element counter-battery radar fixed the point of origin and within 20 seconds the point of origin was passed from the air liaison officer to the MQ-1 crew. Eighty-five seconds after the attack, the MQ-1 had located and was tracking two vehicles fleeing the point of origin at a high rate of speed. The MQ-1 was directed to follow the southern-most vehicle, as a quick response force was assembled. Forty-five minutes into the engagement, the quick response force from the 82nd Airborne apprehended the subjects that were tracked by the MQ-1. There are countless vignettes of this type of joint coordination and critical support that the UAVs provide the ground commander.

WHERE WE ARE NOW

Historically, from 1995 to 2001, the Predator was employed solely as an Intelligence, Surveillance and Reconnaissance (ISR) asset. Since then, we have made enormous strides transforming the Predator into a true Counterland weapons system capable of affecting the entire battle space. The Predator can execute and switch quickly among any role in the Find, Fix, Track, Target, Engage, and Assess (F2T2EA) kill chain. The Predator's long endurance also allows me to combine several of these missions within a single sortie. Recently, we have employed Predators in the following roles:

- Traditional ISR collection – performing intelligence preparation of the battlespace (IPB) collection
- High Value Targeting (HVT) – e.g. participating in the capture of Saddam Hussein
- Interdiction – e.g. destroying “Baghdad Bob’s” transmitting antenna in downtown Baghdad with a hellfire missile
- Close Air Support – e.g. coordinating and then firing a hellfire missile at Taliban forces 50 meters from a AF combat controller at the “Battle for Robert’s Ridge” and helping to turn the tide in that struggle
- Force Protection – flying armed escort supporting route reconnaissance and protection for friendly helicopters
- MANPAD/counter-mortar suppression – e.g. providing long dwell surveillance overhead an area and then successfully tracking vehicles leaving the scene of a mortar attack and aiding the Army’s quick reaction force in the apprehension of the suspects
- Combat Search and Rescue (CSAR) – participated in the PFC Jessica Lynch rescue
- SOF infiltration and exfiltration – e.g. discovering a compromised SOF infiltration landing zone (LZ) and executed a real-time divert to a new LZ (surveyed by the same Predator) and ensuring the safe accomplishment of the mission
- Battle Damage Assessment – e.g. providing a near real-time weapons effects coverage of destroyed targets

You and I can be very proud of the efforts of our Predator force. Based at Nellis AFB in Nevada, the 11th, 15th, and 17th Reconnaissance Squadrons (RS) deserve all of the credit. The 11 RS is

tasked with training all of the pilots and sensor operators who have made this system what it is today. The 15 RS and 17 RS are the operational units that employ the system in theater. The 15 RS is totally committed to supporting the theater CENTCOM mission while the 17 RS is equally as committed supporting other government agencies. The 15 RS has been operating theater UAVs 24 hours a day without a scheduled down day since May of 2003. They are proud units and wishing to do more. Unfortunately, there are limits to their capabilities. More aircraft help us manage their maintenance, but do not affect the number of Predators we can fly at any given time. More ground control stations would be helpful, and the system is trying to produce more. But even if we had more ground control stations and aircraft, we would not be able to employ them without more pilots and sensor operators. The 11 RS is currently training at full capacity with its limited assets available. The Air Force is constantly striving to maximize combat operations while keeping the training pipeline flowing.

We have sited and centrally located our Predator flight operations to Nellis Air Force Base where we are sustaining 24-hour a day, seven-days a week operations in support of CENTCOM. While the 15 RS may be in Nevada, it reports to me as the CENTAF commander. By employing satellite control and co-locating our pool of pilots and sensor operators, we have been able to range a larger area of operations, shift orbits between Afghanistan and Iraq, and better manage our pilot/sensor operator force.

We continue to leverage our Predator fleet. I recently moved our Predator operations in Iraq from Tallil AB, Iraq, to a more centrally located base. This move has reduced our transit time to the target area and also allowed us to leverage the line of sight capability of the launch and recovery unit to fly LOS missions in addition to the "remote split operation" flights we operate via satellite from Nellis AFB.

We continue to look for better ways to employ the Predator in support of the ground force and coalition soldiers. Of particular note, this past December we began deploying Receive Only Video Enhanced Receiver (ROVER) in theater. These allow us to truly exploit overhead sensors by allowing us to stream Predator and other sensor video directly to a unit collocated with the supported ground unit. The ROVER systems are being deployed with special operations forces and AF Tactical Air Control personnel operating with and along side the supported ground force. We currently have every available system in theater and have firm orders in to double this vital capability as soon as possible.

CONCLUSION

As a supporting commander, my goal is to ensure our ground forces have all of the support they need to be able to safely execute their mission. I am bringing every asset to bear to assist the daily fight going on at ground level. In addition to the traditional airpower missions, we are taking every system we have and finding any and every way we can to use it to support the ground force. The effectiveness of UAVs as surveillance systems is unmatched, and has had great effect in both theaters of operation; however there are many other airframes and systems we have employed to provide additional support to the ground commander. Despite being designed to target laser guided bombs, in both Afghanistan and Iraq we are employing the targeting pods on F-15s, F-16s, A-10s and the B-52 to provide the pilot with high-resolution video of ground targets, allowing us to use these airframes in non-traditional ISR roles for increased coverage of the battlefield. We have tracked and mapped out many of the vulnerable main supply routes (MSRs), pipelines, and power lines and daily task our crews and UAVs to survey them for suspicious activity. If we see any, we then take a closer look and coordinate with the ground force commander. For example, we recently found suspicious personnel along an MSR – coordination with the ground forces likely prevented an IED from injuring coalition forces. We have also noted black marketeers salvaging copper from newly repaired power lines. While these have not been traditional uses for airpower, they have been effective and that is all that matters. As the air commander, my primary concern is the effect airpower has on the battlefield in support of CENTCOM's mission and our ground force. If I can achieve a particular effect with F-16's with LITENING Pods, then I'll task them. If a Predator UAV is the appropriate vehicle, I'll task it. The bottom line is to create an effect that supports the war fighter and his mission...and keeps him safe.

It has been my pleasure and privilege to have had the opportunity to speak to you today. I am honored to be the CENTAF commander and truly appreciate the support that this committee has provided over the years and I look forward to working with you as we continue to refine our UAV force.

**QUESTIONS AND ANSWERS SUBMITTED FOR THE
RECORD**

MARCH 17, 2004

QUESTIONS SUBMITTED BY MR. WELDON

Mr. WELDON. The Global Hawk is considered a transformational weapon system and the plan, as enunciated by top DoD management, is to get capabilities to the warfighter quickly. Accordingly, the acquisition strategy was restructured from a more traditional production lot approach to an accelerated spiral development of new technologies with concurrent vehicles—44 of the new, larger, and more capable RQ-4B and 7 of the RQ-4A (the latter are similar to the technology demonstrators used successfully in recent military operations). Originally envisioned as a relatively low cost attritable aircraft, the restructure increased system requirements, compressed time for technology development and test, and significantly increased unit costs (average procurement unit cost is not \$5G million compared to an estimated \$10 million at program start). A recent GAO review discusses the lack of technology, design, and production maturity associated with the RQ-4B.

Why does the Air Force believe the accelerated and concurrent schedule is appropriate, feasible, and cost-effective?

What are the major risks posed by this acquisition strategy and how do officials intend to address and mitigate program and technical risks? How do officials intend to address technology risks?

How many RQ-4B air vehicles will be on order or long lead before initial operational test and evaluation (IOT&E)? When will IOT&E and other testing be completed that demonstrates the effectiveness and suitability of the RQ-4B? What risks are involved with this approach and how do officials intend to mitigate risks?

The predator program recently revised its acquisition plans to slow down procurement of its new model, also a larger air vehicle, in order to provide more time for technology, design, and production maturity and testing. Has Global Hawk considered a similar approach and, if not, why not?

What would be major impacts—positive and negative—if the ramp up to production and early quantities of the Global Hawk RQ-4B were decreased to allow more time for product maturity and testing?

Dr. LAMARTIN. Due to Global Hawk's maturity and solid history of performance, the Department of Defense (DoD) believes the benefits of delivering advanced capabilities to the warfighter sooner, out-weigh the inherent risks associated with an accelerated spiral development strategy.

The major risk to the Global Hawk program associated with spiral development is maintaining synchronization of the development, production, integration, and fielding schedules.

To manage this risk, the Air Force (AF) and DoD conduct a variety of program reviews throughout the year to assess program status and schedule information. Interoperability and integration standards are also incorporated in the design to ensure new capabilities (when available) can be readily accommodated and minimize concurrency risks.

As documented in the FY06PB, the Global Hawk program will have 18 RQ-4Bs "on order" and an additional 7 in "long lead" before IOT&E. Currently, the program expects IOT&E to be completed in 3QFY07. The program is currently undergoing a review at the Defense Acquisition Executive (DAE) level, which may result in changes to the delivery and test schedules.

The maturity of the basic Global Hawk platform supports the funded production rate. We are confident of the basic design based on the ACTD outcomes, demonstrations conducted in Australia and Germany, and ongoing operational Global War On Terrorism (GWOT) employment. Accumulation of over 6,000 flight hours has provided substantial risk reduction benefits and continues to affirm confidence in the robustness of the underlying platform design.

A positive impact of production slow-down would be to reduce the program schedule risk associated with integrating and fielding all of the "baseline" capabilities prior to IOT&E.

The primary negative impact is increased unit costs due to a smaller yearly production lot and increased total-program costs, as the production line will be forced to remain open over a longer period of time. There will also be financial impacts

to over 70 small business vendors and subcontractors due to smaller economic-order quantities. Another negative is that the warfighter will have to wait longer to receive any capability instead of incrementally through a spiral approach.

Mr. WELDON. The RQ-4B has a 50% greater payload capacity than the RQ-4A, but is having difficulty meeting size, weight and power (SWaP) constraints in incorporating advanced capabilities and missions. In particular, the planned integration of the Advanced Signals Intelligence Payload (ASIP) on 23 Global Hawks is currently challenged by weight, power, and space limitations. Air Force reports that growth in ASIP weight and power projections has significantly reduced SWaP available for future growth.

What are the more serious SWaP challenges? What are the timeframes needed to resolve these issues in order to meet planned schedules for integration and testing?

What tradeoffs or changes in capabilities have already occurred as a result of SWaP constraints? If constraints cannot be overcome, what other tradeoffs in requirements and capabilities are being considered for the future?

Dr. LAMARTIN. Accommodating ASIP has been resolved within current SWaP constraints and performance goals of the platform. Managing trade space for SWaP on future capabilities will be required during the life of Intelligence-Surveillance-Reconnaissance (TSR) platforms, but is a normal program management action.

None. Building the RQ-4B factored in size, weight and power requirements to configure the aircraft as either multi-INT or with the Multi-Platform Radar Technology Insertion Program (MP-RTIP) sensor only. Regarding tradeoffs, to the extent that endurance exceeds performance goals, decreasing the fuel load can be a tradeoff for increased payload weight.

Mr. WELDON. The current Global Hawk reliability requirements include a vehicle loss rate of 9.5 per 100,000 flight hours for the RQ-4A. A draft system specification for the RQ-4B includes a loss rate of 5.1 air vehicles per 100,000, expecting greater reliability. However, it is unclear as to the basis for the loss rates and whether the calculations include not only reliability but also survivability.

What factors and assumptions were used to determine the loss rates?

What is the actual historical loss rate incurred to date? What were the reasons for each loss?

What is the breakdown the total acquisition quantity for 51 air vehicles in terms of the number of vehicles needed as primary authorized, training, test, maintenance, attrition, etc.?

What was the basis for the attrition factor? How much of the attrition factor is attributed to system reliability issues and how much to survivability in military operations?

Do the missions planned for the ASIP payload have the same survivability factor as the Multi-Platform Radar Technology Insertion Program (MP-RTIP) and was this included in the loss rate determination?

Before the Global Hawk program was reconstructed, the plan was to procure 63 air vehicles and 14 ground stations. Now the plans are for 51 air vehicles and 10 ground stations. How are these original quantities derived? What was the attrition factor at that time? Why is a smaller force now required? Has the need and/or threat changed?

Dr. LAMARTIN. The 9.5 per 100,000-flight hours loss rate for the RQ-4A represents the calculated loss-rate based on the "as designed and built" RQ-4A aircraft. The 5.1 per 100,000 flight hours loss rate for the RQ-4B represents a design goal based upon reliability analysis determined through the System Safety Review process. This analysis included component-level and system-level reliability factors. Survivability assumptions were not factored into the loss rate.

The Global Hawk program lost three pre-production Advanced Concept Technology Demonstration (ACTD) aircraft over the last 7 years. The first loss was Air Vehicle (AV) #2 which occurred in March 1999 soon after the start of flight test activities. It was lost due to inadvertent activation of the termination package caused by human error. The second loss was AV#5 while deployed supporting Operation ENDURING FREEDOM. It was lost in December 2001 due to structural failure of the right "V" tail caused by maintenance/manufacturing installation error. The last loss was AV#4, also deployed, which occurred in July 2002, due to engine fuel nozzle mechanical failure. The program has currently accumulated more than 6,200 flight hours, of which over 59% are in direct support of combat operations. The calculated loss rate at the current time is approximately 67 per 100,000 flight hours. This metric is similar to other DoD flight development programs at an equal maturity level.

Two other points worth noting, the Global Hawk ACTD aircraft were originally designed to only support the ACTD flight test and military assessment program. Some reliability trades were made in the ACTD design to reduce cost and accelerate schedule given the unclear future of the program. These assets have gone far beyond their original design goal demonstrating the flexibility of spiral development and delivering combat capability years ahead of a more traditional acquisition program. Supporting CENTCOM, in a wartime location, the ACTD aircraft have received significantly less maintenance than that envisioned for the development flight effort. Even under these severe conditions, the system (aircraft and ground station), has performed remarkably well. It should be noted that AV#3 has accumulated over 2100 hours in combat operations since May 2004. As a comparison, a typical U-2 would accumulate approximately 778 hours in the same time period.

Global Hawk Aircraft Losses

Aircraft Loss	Date of Loss	Total Accumulated Flight Hours
AV#2	March 1999	148
AV#5	December 2001	1777
AV#4	July 2002	2806

Breakdown the total acquisition quantity:

- 51 Total Aircraft Inventory (TAI)
- 18 Primary Mission Aircraft Inventory (PMAI)
- 2 Primary Training Aircraft Inventory (PTAI)
- 4 Primary Development/Testing Aircraft Inventory (PDAI)
- 4 Back-up Aircraft Inventory (BAT)
- 12 MP-RTIP aircraft
- 11 Attrition Reserve (AR) aircraft (7 x RQ-4A and 4 x RQ-4B aircraft)

The attrition factor assumes an anticipated loss rate to sustain an 18-aircraft (PMAI) operational squadron over the life of the program. Attrition factors consist of design numbers, system maturity, and non-material failures, and are based on operations in a non-combat environment. They are not attributable to survivability in combat operations.

The loss rates in the attrition factor are based only on the platform attrition rates as discussed above. Since survivability is not a part of attrition calculations it is not reflected in an attrition loss rate determination for any specific payload.

The plan for acquiring 63 aircraft was based on an Analysis of Alternatives (AoA) for a U-2 replacement capability in a two-theater war scenario. This required ten orbits: six for imagery and four for signals intelligence. These requirements, along with test and training requirements, drove a total requirement for 14 ground stations.

The operational need and threat have not changed. However, the AF is now acquiring a larger aircraft that can carry both imagery and signals intelligence payloads simultaneously and a Multi-Platform Radar Technology Insertion Program (MP-RTIP)-only version. The increased collection capability of the multi-INT (imagery and signals intelligence) RQ-4B allows for a reduction in continuous orbits from ten to six while providing both imagery and signals intelligence for improved warfighter support.

Mr. WELDON. A full-rate production decision to buy 31 air vehicles with either ASIP or MP-RTIP is scheduled for early fiscal year 2007. Under the current acquisition strategy, initial operational testing that supports this decision will not have these two payloads integrated onto the air vehicles for testing.

What are the risks in making the full rate decision without operationally testing a fully integrated Global Hawk with these payloads? How do you mitigate these risks?

Since those systems will not be operationally tested before the full-rate decision, what information about these payloads—including the maturity of technology, design, and manufacturing processes—will be available to support the decision?

At what point will you have assurances that fully configured air vehicles with ASIP and MP-RTIP are operationally effective and suitable?

What is the schedule for transitioning from producing the A model to the B model? What production challenges are being addressed at the prime contractor and subcontractors?

Dr. LAMARTIN. The Air Force believes the risks to the overall program are low, since the emphasis in initial operational testing will be to validate the mission suitability of the platform integrated with the Integrated Sensor Suite (electro optical/infrared sensor and synthetic aperture radar). The ASIP and MP-RTIP sensors represent incremental improvement in Global Hawk's overall mission capability. Both of these sensors will undergo their own operational test leading to their own full rate production decisions.

The Initial Operational Test and Evaluation (IOT&E) and subsequent Full Rate Production (FRP) decision will be based on the initially fielded configuration of the RQ-4B, which does not include either MP-RTIP or ASIP. Continuous dialogue among the Global Hawk, MP-RTIP, and ASIP program offices will ensure that detailed technical knowledge from program reviews of these payloads is available when the FRP decision is made.

Effectiveness and suitability of ASIP—and MP-RTIP—configured systems will be established through Operational Test and Evaluation. As documented in the FY06PB, the current plan tests ASIP with a mini-Operational Assessment, follow-on Operational Test and Evaluation (OT&E). MP-RTIP will be tested with a dedicated, second OT&E. The program is currently undergoing a review at the DAE level, which may result in changes to the delivery and test schedules.

Production of the RQ-4A configuration is in its final stages and will end after seven Air Force and two Navy aircraft are complete (end of CY05). RQ-4B production has already begun with the eighth Air Force aircraft and will continue through FY11 (aircraft 51). The most significant challenge to the RQ-4B production is with wing manufacturing. The Air Force is directly involved with the prime manufacturer and its sub-contractors to manage the B-model's wing production schedule.

Mr. WELDON. We understand that the original requirement for defensive subsystems on the Global Hawk has been deferred for possible inclusion later in the program. A July 2003 report from the Air Force Scientific Advisory Board recommends new UAVs to perform missions not feasible for the Global Hawk and other ongoing programs, particularly in high threat environments.

What considerations caused the Air Force to lower the priority for defensive subsystems on the Global Hawk?

Are defensive systems still being considered? If so, what is the planned schedule for implementation? What are the estimated costs to add defensive capabilities? What other actions might be taken to enhance survivability?

Will adding defensive systems or other survivability measures have any impacts on planned loss rates? Explain.

Have higher unit cost or survivability concerns resulted in changes to expected mission profiles or planned use of the Global Hawk?

Did the lack of a defensive suite on the Global Hawks used in Operations Enduring and Iraqi Freedom limit their use in any way? Explain.

Are the new systems suggested by the Scientific Advisory Board viewed as complementary to the Global Hawk or intended to replace it? How might this affect the total number of Global Hawks to be procured.

Dr. LAMARTIN. The Air Force has put a lower priority for defensive subsystems based primarily on anticipated mission CONOPS as a high-altitude, standoff Intelligence-Surveillance-Reconnaissance platform.

The Air Force retains the requirement for Global Hawk defensive systems, and they may be added as size, weight and power challenges are met and funding is identified. The timing of any future integration and cost associated with a defensive subsystem has not been determined. The Global Hawk's high operating altitude and normal standoff employment afford it a measure of protection and enhanced survivability without additional equipment.

Adding a defensive subsystem will not affect projected loss-rate calculations as they are based on non-wartime operations. However, having a defensive subsystem would enable the Global Hawk to be more survivable in certain combat environments.

No. Neither the unit cost nor survivability status has changed the overall mission profiles or planned use of the Global Hawk.

No. Air superiority was not a significant issue by the time Global Hawk deployed. Where there was remaining uncertainty, the Combined Forces Air Component Commander evaluated the risk and employed the Global Hawk as needed.

The Scientific Advisory Board (SAB) recommended the Air Force begin Analysis of Alternatives and design trades on the Survivable High Altitude Endurance and

the Survivable Large UAV systems. The Air Force has conducted analyses and assessments of these proposed UAV systems and continues to evaluate their potential value. To date, there have not been any results to suggest developing a new UAV system to either complement or replace Global Hawk.

Mr. WELDON. GAO's prior and current reviews of DoD's unmanned aerial vehicle (UAV) programs identify a multitude of acquisition strategies being followed. The Global Hawk, for example, adopted a spiral development strategy to acquire two different models on an accelerated schedule. The Predator programs established individual processes and milestone decisions to acquire its two models and recently changes its acquisition approach for its second model from a spiral development to a block acquisition strategy. The Unmanned Combat Air Vehicle (UCAV) is also planning a more incremental block approach and took steps to provide more time to match the system's requirements to available resources before the start of product development. The GAO recently identified increased risks associated with the Global Hawk's concurrent development and production schedule and has previously reported that the revised UCAV reduced risk.

Why are similar UAV programs following substantially different acquisition strategies?

What is the justification and rationale underlining each acquisition strategy for these programs?

Not that all programs should necessarily have the same strategies, but isn't there some common ground and similarities to UAV development and production which indicate that more similar acquisition strategies would be effective and perhaps yield crossbenefits?

Dr. LAMARTIN. The Air Force is pursuing different UAV programs to satisfy different missions. The varying acquisitions strategies are based on factors such as defined requirements, technology maturity, overall program cost, and operational experience.

UCAV is a subset of Unmanned Aerial Vehicles, which are designed to operate in the combat environment and deliver munitions. Predator B falls in this category, as does the Joint Unmanned Combat Air System (J-UCAS). Predator B is currently following a more traditional development and procurement strategy. J-UCAS is a demonstration program with a milestone decision planned at the end of Operational Assessment in the FY10 time period.

Predator A and Global Hawk, on the other hand, were both effectively demonstrated during their ACTD and subsequent operational experiences. Because of these factors, the Air Force recognized that Predator A and Global Hawk represented unique opportunities to accelerate demonstrated capability while managing the risk of concurrent development and production.

Yes, to a degree. The Air Force continually examines all acquisition programs, evaluates program risk and maturity, and assesses current acquisition strategies. For example, as stated above, Predator B and UCAV are following similar acquisition strategies due primarily to their current level of maturity.

Mr. WELDON. A July 2003 report on UAVs from the Air Force Scientific Advisory Board identifies a need for three new UAV programs in addition to the ongoing Predator, Global Hawk, and UCAV programs. The Board concludes that the current programs cannot perform all the required missions. The new programs appear to incorporate similar capabilities and perform similar missions as the ongoing programs with the exception of survivability in high threat environments.

What is the status of the new systems proposed by the Scientific Advisory Board? Does the Air Force plan to further evaluate these proposals and conduct analyses of alternatives to determine future UAV requirements?

Is the Air Force looking at other alternatives, such as modifying and/or adding new models of current systems?

Since survivability appears to be one of the chief drivers of the new proposed systems, does the Air Force no longer intend to add defensive systems to the UCAV and Global Hawk?

Are these proposed new systems viewed as complementary to current systems, or are they expected to largely assume the missions of the predecessors? If this is the expectation, in what timeframe will this occur? How does this affect the quantities and required capabilities for UCAV, Predator, and Global Hawk?

Dr. LAMARTIN. The Air Force Scientific Advisory Board (SAB) recommended the Air Force begin Analysis of Alternatives and design trades on the Survivable High Altitude Endurance and the Survivable Large UAV systems. The Air Force has conducted analysis and assessments of these proposed UAV systems, and continues to evaluate their potential value.

The SAB also identified the potential value of a family of miniature UAVs, and recommended the Air Force continue innovative research into small UAV platforms. The Air Force is implementing this recommendation. In early 2004, Air Force Special Operations Command (AFSOC) was designated AF Lead Command for Small UAV matters. Later in the year, a Small UAV Program Office was established at Wright-Patterson AFB, OH. Currently, AFSOC elements are employing Pointer and Raven UAVs in a variety of roles supporting GWOT, and AF Security forces are using the Desert Hawk Force Protection Airborne Surveillance System (FPASS) to enhance base security in hostile areas. The Battlefield Air Targeting Camera Autonomous Micro Air Vehicle (BATCAM) is now being tested prior to potential fielding as part of the AF Battlefield Airman Operation Kit. The Air Force is continuing research into small aircraft aerodynamics and control techniques, as well as miniaturization of payloads and power sources. The Air Force has drafted a Small Unmanned Solutions (SUS) Initial Capability Document (ICD), now in Joint staffing, that establishes the broad requirement for a family of Small UAVs. The SUS ICD will support development of specific system capability requirements, and establishment of appropriate acquisition programs.

Overall, the Air Force views the work of the SAB as highly informative, particularly in regard to better understanding technology maturity and anticipated time frames for potentially advancing the capabilities of a future family of UAV and UCAV systems.

The Air Force continually examines its Concept of Operations and experiments with current UAVs to find better ways to address immediate operational priorities and near-term capability needs identified by Combatant Commanders. With respect to new classes or additions to the current UAV family, the Air Force is using the Joint Unmanned Combat Air System (J-UCAS) System Demonstration Program (SDP) to operationally assess the contribution and validity of potential future warfighting capabilities like those identified in the SAB recommendations.

The Air Force is addressing survivability on the J-UCAS program at the system level, where many factors work together to address survivability and mission effectiveness. The survivability of J-UCAS is classified and its expected effectiveness can be provided under separate cover.

The Air Force retains the requirement for Global Hawk defensive systems, and they may be added as size, weight and power challenges are met and funding is identified. The timing of any future integration and cost associated with a defensive subsystem has not been determined.

Small UAVs will initially provide a new organic capability for Air Force Special Operations and Security Forces, and may expand into other mission areas as technology advances. They are expected to complement and enhance current capabilities rather than replace them.

As the J-UCAS Operational Assessment (FY07-10) nears completion, both the Department of Defense and the Services will be in a better position to frame the system development, production and fielding opportunities for one or more of the SAB-proposed UAV or UCAV systems, and to identify their effects on current UAV programs.

Mr. WELDON. I would ask each of you, if you could for the record to summarize for us the process that is used to bring that feedback from the use of the UAVs to you and how that feedback then goes into the designers and the producers of UAVs, so that we can better improve the next generation of UAVs.

There must be a formal process that you have in place to get that feedback coming out of the field and help us understand what that is, if you can for the record.

General BUCHANAN. There are multiple avenues by which feedback from the fighting forces is continuously received and acted upon to enhance the support they receive. A principle means is the "lessons learned" collection and resolution process. In 2004 the Chief of Staff of the Air Force established the Air Force Office of Lessons Learned under the Deputy Chief of Staff for Air and Space Operations. This organization was chartered to collect, analyze, track and disseminate the vital data and issues associated with our combat lessons learned.

There is no separate process or office that deals purely with unmanned aerial vehicles issues. The Office of Lessons Learned looks at all Air Force Weapon Systems and processes. When a lesson learned is generated, it is sent to the appropriate major command, in addition to individual program functional managers, requirements and acquisition personnel, to ensure the right people are provided proper insight. This might mean a change to Doctrine, Organization, Training, Material, Logistics, Personnel, or Facilities (DOTMLPF). These DOTMLPF changes or recommendations all feed into the Joint Capabilities Integration and Development System (JCIDS) process, ensuring that other Service, Agency, Joint Staff and individual

Offices of the Secretary Defense have visibility, a voice, and can share in these lessons and their outcomes.

Mr. WELDON. Is there an equivalent situation in the Air Force the equivalent of what General Thurman was talking about the acquisition? Let me make sure I got it exact—Aviation program executive officer, something of that nature, where you are concerned, in relation to the Under Secretary of Defense for AT&L?

General BUCHANAN. The Air Force has a similar PEO structure to the Army. Air Force UAV management, including Global Hawk and Predator programs, is centralized under the PEO for Aircraft (PEO/AC) at Wright-Patterson AFB, Ohio. PEO/AC reports to USD(AT&L), in consultation with the Air Force Service Acquisition Executive, on major defense acquisition programs (e.g., Global Hawk), in accordance with the DOD 5000 series directives.

FISCAL YEAR 2005 NATIONAL DEFENSE AUTHORIZATION ACT—DEPARTMENT OF THE NAVY AND DEPARTMENT OF THE AIR FORCE TACTICAL WEAPON ACQUISITION PROGRAMS AND FUTURE TECHNOLOGY INITIATIVES

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE,
Washington, DC, Thursday, March 25, 2004.

The subcommittee met, pursuant to call, at 9:08 a.m., in room 2118, Rayburn House Office Building, Hon. Curt Weldon (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

Mr. WELDON. This morning the Tactical Air and Land Forces Subcommittee meets to receive testimony on tactical aircraft and related programs in the fiscal year 2005 budget request.

We have two panels of witnesses: the first representing the Government Accountability Office (GAO) to provide the subcommittee with their views on the status of the F/A-22 and the Joint Strike Fighter (JSF) programs; and the second, representatives of the departments of the Navy and the Air Force to provide us an update on the F/A-22 and Joint Strike Fighter and other major tactical aircraft and related programs.

I have maintained through the years, first as Chairman of the Military Research and Development (R&D) Subcommittee, and again as Chairman of the Military Procurement Subcommittee, and now today that the proposed defense budgets were, and still are, insufficient to adequately fund the programs included in the budget requests.

This is particularly true for the tactical aviation programs, to include the Comanche helicopter program. Unfortunately, this is exactly what has and is happening. Comanche has been canceled, and I might say it was canceled in a manufacturing facility right next to my district.

But I support that cancellation, so let that word go out. I support the cancellation of a program right next to my district because we cannot afford the Comanche with all the other priorities we have and the budget pressures that we are facing.

So, for anyone to say that somehow I have a parochial interest, nothing could be farther from the truth.

And for my colleagues in the room who were out in favor of certain industries or contractors, let me just say, "We are in the midst of a massive train wreck, financially." We need to understand that.

The Comanche has been canceled. The F/A-22 cost increases continue to result in the reduction in aircraft, with the total buy now projected at 218 aircraft.

Last year, the Navy reduced its projected buy of Joint Strike Fighters by over 400 aircraft, and the first flight of the Navy Joint Strike Fighter is still well over three years away.

Looking at the long-term and the overall DOD budget, Congressional Budget Office (CBO) projects an approximate 30 percent shortfall in required funding to execute the long-term defense plan. Given the overall national fiscal realities, this portends further program adjustments.

The F/A-22 program began in 1986 with a plan for 750 aircraft. With the subsequent reductions related to the end of the Cold War and the much smaller defense budgets, the Air Force had a procurement objective in 1998 of 381 aircraft.

Since that point in time, with continued program cost increases and with the congressionally imposed cap on the production program, the Department of Defense (DOD) and the GAO agree that the likely buy is now approximately 218 aircraft.

The good news is that progress has been made in the last year with the F/A-22, with apparent resolution of the vertical tail buffet problem and improved avionics software reliability, which is an issue we focused heavily on in last year's hearing.

Both the F/A-22 and Joint Strike Fighter are very complex systems and offer to provide our military services with superior capability. But both of these programs are costly to the American taxpayer and we must do everything we can to contain those costs.

The F/A-22 R&D and procurement costs have increased well over 100 percent. The R&D estimated cost of the Joint Strike Fighter is already up 80 percent. In just the last year alone, the Joint Strike Fighter R&D program has gone up 22 percent.

I appreciate the technical challenges in these programs. But when we have senior DOD representatives testify before us, as to the importance of accurate costing to the credibility and integrity of the acquisition system, tell us that all the major programs have been re-baselined for cost, and then we continue to incur double digit cost increases on an annual basis on many of our major programs, credibility does indeed suffer.

If we are to make informed judgments on programs, we have to do a better job at estimating program costs.

Another area of concern is in the electronic combat mission area.

DOD plans project going from one major platform, the EA-6, to at least four: the EA-18, the B-52, miniature air launched decoys, and a Joint Strike Fighter derivative.

The Joint Unmanned Combat Air System (JUCAS), formerly the Unmanned Combat Aerial Vehicle (UCAN), is a fifth platform mentioned for the electronic combat role. Unfortunately, it now appears that this program has been orphaned by the Air Force and Navy and is a \$700 million program in Defense Advanced Research Projects Agency (DARPA).

Without service funding, we may be missing an opportunity to address a variety of strike and electronic combat requirements with what would be a truly transformational capability.

We look forward to hearing from our panels about these programs today.

And just a word before I introduce the panel.

You do not come to a hostile committee; but you come to one that is taking a very objective at where we are right now. There is no sense in putting a sugar coating on the difficult financial problems that we are facing as we attempt to do next year's authorization bill.

There are no easier ways to go about fully funding three tactical aviation programs, increasing our surface and submarine fleet from its current status of 294 ships to somewhere in the range that is acceptable to the Navy, fully funding missile defense, which is a top priority of both the Congress and the White House, and taking care of all the quality of life issues that we have as a country, as well as other new programs like our work with Unmanned Aerial Vehicles (UAVs) and so many other areas.

So, we have tremendous pressure. And you have to understand that we are going to look at these programs in a very careful and a very intense way.

And as I said before, we will take no exceptions. And I can say that with full credibility because of the cancellation of the Comanche. If I wanted to fight to save a program, that would have been it, and I am not doing that.

So I am sending a signal to my colleagues, in both parties: The time has come for us to be tough about the way we are spending money on programs that we cannot see the ability to fund in the out-years. And that may sound a little bit harsh, but that is the reality of where we are.

And you might as well understand the pressure that we are going to be under. And no amount of lobbying, no amount of personal conversation with individual members in both parties, in both bodies, is going to solve the problem of the dollar shortfall that we face.

On the first panel representing the General Accounting Office is Mr. Allen Li, director of acquisition sourcing management for the F-22, supported by Mr. Mike Sullivan, director of acquisition sourcing management for Joint Strike Fighter.

Our second panel of John Young, Assistant Secretary of the Navy, Research Development and Acquisition, supported by Admiral John Nathman, Deputy Chief of Naval Operation Warfare Requirements and programs; Lieutenant General Mike Hough, Deputy Commandant for Aviation.

From the Air Force we have Dr. Marvin Sambur, Assistant Secretary of the Air Force, supported by Lieutenant General Ron Keys, Deputy Chief of Staff for Air and Space Operations.

Thanks to all of our witnesses for joining us. We look forward to your testimony. Your statements shall be entered as a part of the record.

But before I begin, my good friend from Hawaii is not here. He had an emergency, Mr. Abercrombie. But we have an absolutely very capable fill-in from the great state of Washington, and I would

like to ask him to make any opening comments he would like to make—Mr. Smith?

[The prepared statement of Mr. Weldon can be found in the Appendix on page 353.]

STATEMENT OF HON. ADAM SMITH, A REPRESENTATIVE FROM WASHINGTON

Mr. SMITH. Certainly.

Mostly I just want to agree completely with the statements of the chairman. I think he has correctly identified the challenges we face, and I agree with how we should approach them.

It is certainly not peculiar to the defense budget that we have more demands than we have money. That pretty much is the operating procedure for the entire federal government, as far as I can see.

But choices have to be at some point, and I hope we will begin to make those choices so we can be smart about it instead of having to do it at the last minute when there is absolutely no choice since we do not have the money.

Certainly, we hate to get as far down the road as we did in a program like Comanche—I believe the figure was \$8 billion that was spent and we have nothing for it. Advanced planning hopefully can avoid wasting that amount of money.

The other thing that I am very curious to hear about is something that has been of concern to me: the length of time it takes to put together these programs before we actually get something in the field.

Now, I am far from an expert in this area, and it is possible there is something I am missing. But I am pretty sure that if you went to your average person in this country and said, "We have been spending money on the F/A-22 for 18 years and we don't have a plane yet that the military can use," I do not think that they would think that that works very well.

And I do not know off the top of my head what the amount of money is we have spent on the F/A-22, but I know it is not insignificant—a lot of money to spend for nothing.

And I just want to know if there is some way to speed up the procurement process to get a better idea of what we are capable of. How can we go that long a period of time and not have a product?

And the F/A-22 is an extreme example, but there are other programs and different branches that have that same result.

So I am curious about that.

The other thing I am curious about is if it is going to take this long for the F/A-22, probably for the Joint Strike Fighter—I think at this point it is pretty good money to bet that that will be extended out further than even currently is planned—what do we do in the meantime?

If in fact we thought we had to have the F/A-22 by, I forget what the original date was, but it is long since passed, if we had to have it by then, what are we doing? What is plan B? Do we build more F-16s, more F-15s? Have we changed what our mission is, and if we have changed what our mission is why are we continuing along the same path?

So, those are a few things that I am curious about as you testify.

And again, the most important points were made by the chairman. We have significant challenges in terms of money, budgets, and we need to be smart about that so that we do not waste that money on programs we cannot finish.

So, I look forward to your comments.

I thank the chairman for his.

Mr. WELDON. I thank the gentleman for his exceptionally appropriate comments.

I would like to proceed with our first panel's testimony and then go into questions for that panel. And then we will take testimony from the second panel, which will be followed by questions and try to get to all the members that are here for questions.

And I would ask our panelists in the second panel to closely listen to the testimony of the first panel so we can have a dialogue where there are perhaps differences or perhaps disagreements on the programs.

With that, Mr. Li, please proceed with your opening remarks. Your statement has been entered without exception or objection as a part of the record.

STATEMENT OF ALLEN LI, DIRECTOR, ACQUISITION SOURCING MANAGEMENT, UNITED STATES GENERAL ACCOUNTING OFFICE

Mr. LI. Thank you, sir.

Chairman Weldon, Mr. Smith and Members of the subcommittee, thank you for the opportunity to discuss the status of the F/A-22 and Joint Strike Fighter, also known as the Joint Strike Fighter.

Still fresh in my mind is the commitment I made to the chairman last year that we would continue monitoring the F/A-22. Joining me at the table today is my colleague, Mike Sullivan, who is an expert on our weapons acquisitions work. He will be ready to answer any Joint Strike Fighter-related questions you may have after my remarks.

The prepared statement before you is based on our recently issued report on the F/A-22 and more limited work we have completed on the Joint Strike Fighter.

In deference to the time allotted, I will summarize our prepared statement by making four points.

Point number one: The Air Force has corrected many of the F/A-22's design problems we discussed last year. For example, to correct the movement, or buffeting, of the vertical fins in the tail section of the aircraft, the Air Force designed and implemented modifications that strengthened the fin and hinge assemblies.

Last year we reported that this problem caused the Air Force to place restrictions on flights below 10,000 feet. Testing has since been completed below 10,000 feet and flight restrictions have been removed.

Likewise, the Air Force modified the aircraft to prevent overheating concerns in the rear portion of the aircraft by adding thermal protection and strengthening strategic areas in the tail sections.

Point number two: Major challenges remain as we approach DOD's planned December 2004 date for making a full production decision for the F/A-22.

At the time we completed our work, the Air Force's efforts have stabilized avionics software and improved its performance were not sufficiently demonstrated to start independent operational testing.

Indeed, two months ago, the program had achieved 2.7 hours, which is 54 percent of the five hours to build the requirement to begin operational testing.

We note that while the Air Force was not able to meet this criteria, major failures that result in a complete shutdown of the avionics system significantly diminished. They occurred about every 25 hours on average.

As you recall, Mr. Chairman, that was as bad as one-and-a-half hours last year, so that is an improvement.

This improvement has been the result of a substantial effort on the part of the Air Force and the contractor to identify and fix problems with the software. However, less serious failures were still occurring frequently.

The F/A-22 program was not performing as expected in some other key performance areas, such as system reliability. These problems have contributed to the need for a new test schedule and an additional seven-month delay in the start of operational testing.

Looking out in the future, to accomplish an expanded ground attack missions, the Air Force would need to make additional investments, estimated by the office of the secretary's Cost Analysis Group to be in the order of \$8 billion.

Incorporating this capability will also add risk to an already challenged program. Planned changes will require a new computer architecture and processors to replace the current less-capable ones.

Point number three: The JSF acquisition program is approaching a key investment decision point in its development as it prepares to stabilize the design. We are aware that the program managers are contemplating changes to the program, but confirmation and details are not yet available.

Weight has become the most significant design risk for the program as it approaches its critical design review, which is a major milestone in the aircraft's development.

Increased weight could degrade aircraft range and maneuverability if not brought under control.

Because the Joint Strike Fighter is a joint, multi-national acquisition program for the Air Force, Navy, Marine Corps and eight other cooperative international partners, it has additional challenges not facing the F/A-22.

For example, support for the program from our international partners hinges on expectations for financial returns, technology transfer and information sharing. If these expectations are not met, that support could deteriorate.

In addition, a large number of export authorizations are needed to share information and execute contracts. These authorizations must be done in a timely manner to maintain schedule and ensure competition.

Finally, transfer of sensitive U.S. military technologies needed to achieve commonality in the interoperability goals would push the boundaries of U.S. disclosure policies.

My last point, and something that the chairman and Mr. Smith mentioned: DOD is not immune to efforts to address the fiscal imbalance confronting the Nation and will continue to face challenges based on competing priorities both within and external to its budget.

The next panel will no doubt tell you that they are not looking for a fair fight in any future conflict. I agree with that. Our armed forces deserve the most capable weapon systems we can field, but they must be fielded with the capabilities and in the quantities we can afford. This will require decisions based on a sound and sustainable business case for DOD's acquisition programs based on clear priorities, comprehensive needs assessments and a thorough analysis of available resources.

The ripple effect caused by one program's funding and another is being reduced or eliminated cannot be ignored.

In addition, DOD needs an acquisition process that provides for knowledge-based decisions at critical investment junctures in order to maximize available dollars.

DOD has instituted a new acquisition policy that embraces evolutionary and knowledge-based acquisition concepts. However, policy alone will not solve the problems DOD faces. This will also require disciplined actions on part of DOD's leadership to employ the concepts established in this new policy.

While it is too late for the F/A-22 to go back and follow these knowledge-based concepts, there still is time to evaluate the need for additional aircraft going beyond those on contract.

Because of the Nation's fiscal challenges, tough choices will need to be made regarding all future spending priorities, including the remaining potential \$40 billion investment in the F/A-22.

In light of this substantial investment and the many changes that have occurred in the F/A-22 program, we recommended last week that DOD conduct a new business case that examines the need for full air-to-air and air-to-ground capabilities and the quantities needed and affordable.

As far as the JSF is concerned, we believe that program has a greater opportunity to make critical investment decisions using a knowledge-based approach.

The JSF program started with a high-risk approach by not maturing technologies before starting system development, but it now has the opportunity to manage the system development phase and stabilize the design before committing to large investments and manufacturing capability.

In addition to seeking greater design stability, leadership in the department can reap the benefits of its new acquisition policy by actively promoting and maintaining a disciplined approach throughout the remaining critical decision points.

With these activities in place, we believe DOD will be in a better position to request continued Joint Strike Fighter funding and support.

Mr. Chairman, this concludes my statement. Mr. Sullivan and I would be happy to respond to any questions you and your committee may have.

[The prepared statement of Mr. Li can be found in the Appendix on page 359.]

Mr. WELDON. Thank you for your statement. And more importantly, thank you for your work. It is critically important to us as we go through the mark-up process for next year's defense authorization bill, more importantly, planning for the future support for outstanding military for the next 50 years or so.

For our colleagues that are here today, I just want to continue to repeat the fact that where we are today is not something that we did not anticipate. For the past eight years at least, many of us have done speech after speech talking about the train wreck that we were going to face, where the programs we were putting into play were not going to be able to be funded with the dollars that were anticipated for our defense budget.

And that was especially true in the years up until 2000 when we actually saw a defense budget that was not increasing relative to what it had been prior to that time.

We have made increases since that time period, but we still have significant problems.

In this case, talking about tactical aviation, if you look at the dollar amounts, it just puts us in an impossible situation that each year we fight the same battle and what we end up doing is starving a lot of programs and keep pushing out the element decision, like the one that was just made with the Comanche, where the Comanche was finally canceled after six major changes to what the program was supposed to originally be.

And so, our job, as difficult as it is, is going to have to be able to make some extremely difficult and tough decisions. And you are going to look at us through that process—you already have.

You made a very important point here: The business case made to justify the F/A-22 program at its outset is no longer valid. The threat that we thought that the F/A-22 was going to be able to meet has gone. And now we are attempting to retrofit this program to meet other threats that we assume now are in fact coming on the horizon.

But with those changes are extremely costly dollar commitments that will be necessary.

Today the Air Force estimates that the total F/A-22 option program will cost about—is it \$72 billion you said, sir?

Mr. LI. That is correct.

Mr. WELDON. Excluding about \$8 billion estimated by the Cost Analysis Improvement Group (CAIG-2) complete modernization activities—including your cost for that, you are talking about \$80 billion.

If we look at a Joint Strike Fighter, the program, as I understand in reading your report, the profile assumes a \$90 billion funding element over the next 10 years—an average of almost \$9 billion a year.

And while the F/A-22 has been changed, and we can have Members talk about that, in terms of its mission and business plane that was established and now it has been modified, we will hear from our witnesses I think today that the Joint Strike Fighter also has a unique role because you need a replacement for the Marines for the (V/STOL) variant and that cannot occur without the Joint Strike Fighter.

The problem we have and the dilemma we have, which is one that we have to take very seriously and which puts us in the middle of a tremendous amount of tension, is how do we deal with this? If we are not going to give significant increases in dollar allocations to buy these programs and continue to fund the F/A-18E/F, then something has to give.

That something that gave in the Comanche is what we are potentially facing if not this year certainly over the next several years.

And I just want us to be in the best possible position to make the most informed decision that we can.

What would happen if one of these programs were canceled? What would happen in terms of your own feelings and assessments with the services?

What would the response be and how difficult would it be if, heaven forbid, that decision did happen? And I would say, a year ago no one expected the Comanche to be canceled within a 12-month period.

So what would happen if Congress were forced or the Administration were forced into that kind of position?

Mr. LI. Mr. Chairman, as far as the F/A-22 is concerned, over 50 of the aircraft are on contract and soon even more than that, as I understand it, because the next lot they are preparing to make a contract for that also.

So we are talking about slightly about one wing of F/A-22s and, as in many other weapons systems that we have had in the past, this is maybe regarded then as the golden nugget. You would only have one wing of F/A-22s to perform that mission.

That would obviously severely impact on the Air Force's capability to conduct its operations in the future. They were counting on the F/A-22 to help them reduce the average age of aircraft, which Mr. Smith points out.

There are a lot of other needs. Their aircraft are aging. The operations in Iraq have stressed the F-16s tremendously, and they are in need of replacement in the future.

And so the F/A-22's cancellation—or I would not say cancellation—but not going beyond the lots that they have already will impact their mission.

As far as the JSF is concerned, that is a very complicated acquisition because we have memorandums of understanding with our industrial partners.

There are three services that are involved in this. We are talking, as you pointed out Mr. Chairman, the Marines are—and you will probably hear this from the Marines—they are counting on the JSF to perform those missions which the Harrier currently performs.

Mr. WELDON. Could you also comment on the, with the Joint Striker Fighter, the commitment of the foreign nations? I think we just signed up our last nation as a part of that team. Would you comment on the importance of that in terms of our multinational cooperation?

Mr. LI. Absolutely.

We are talking about a situation where, in the future, we would want to have the interoperability with our allies, and I think that is extremely important.

We are also talking about a much larger program than the F/A-22.

The F/A-22, in the range of 277 to 300, what is the market for the Joint Strike Fighter? We are talking about 2,500 for U.S. forces, over 700 for our international partners, and the potential for further sales in the range of 1,500 to 3,000. So that is a much larger program.

STATEMENT OF MIKE SULLIVAN, DIRECTOR, ACQUISITION SOURCING MANAGEMENT (JOINT STRIKE FIGHTER) UNITED STATES GENERAL ACCOUNTING OFFICE

Mr. SULLIVAN. I think, if I could add to your question, what would happen if perhaps the Joint Strike Fighter did not go forward. Just in terms of tactical aircraft, I think our strike capability right now, that is seen as a replacement for the F-16 and A-10's as they retire. So in the out-years we would probably have some things to fill.

In terms of strike capability, it has a role in complimenting the F/A-22 on many of the F/A-22's missions. So that would be an impact as well.

And, as Mr. Li stated, internationally, I think interoperability is key, and Joint Strike Fighter is a weapons system that we are looking to be interoperable not only across the services but with our NATO allies and internationally as well.

Mr. WELDON. One final question before I turn to my colleagues.

In your assessment of these programs, along with the F/A-18E/F—I think if we are honest with ourselves and with the Pentagon and the services, we will be able to see X amount of dollars for tactical aviation over the next 20 years, a fixed amount.

I mean, we can have our pipe dreams and hope that everything will be fully funded. Well that is not going to happen. It is not going to happen.

And if we keep kidding ourselves along that line, down the road at some point in time, there has to be a tough decision.

And again, I think back to the Comanche. We spent \$6 billion keeping the Comanche as a viable program even though it was reconfigured six times, then we canceled it.

What we could have done with that \$6 billion, even though a lot of that technology is going to be used in modernizing our rotorcraft fleet and our capabilities, but I do not want to see us do that with tactical aviation. I would rather have us fully understand logically what the dollars are realistically going to be available in TACAIR and then go back and say, "Hey, can we really afford three separate programs?"

And again, I support all three; I am not against any program. I understand the need.

And if I had my way, as I have done with my votes repeatedly in this body, I would vote for the funding to fund all three.

That is why I was the only Member of Congress that opposed the president's budget when he first came into office, because his request for shipbuilding was too low. And I said, "How you can make that request and fully fund these other requirements?" We cannot do it.

And rather than fight these battles each year, where each company and service lines up behind their program and comes in and puts tremendous pressure on us to fund this or that program, knowing full well that in the end somebody is going to have to make tough decisions, I would rather have us look at what is going to be the available stream dollar-wise, five, 10 years from now so that we can maximize the effort in whatever aviation program, or programs, can in fact provide the best.

Have you all done that in terms of the mix?

Mr. LI. No, but that is exactly the sort of analysis that we are recommending because in order to assess the F/A-22 you cannot assess it by itself, it has to be within this environment of the availability of tactical air dollars that are available.

And so our recommendation that they do a business case should be done at that level.

And I think that it should not be the program office of F/A-22 making a case for their own, it has to be at a much higher level where they can have overview and oversight over all these programs and they make those decisions: what are the quantities that we need, what IS the threats, what is the best mix of those weapons that we need to address the threat to make them available within that context?

Absolutely agree with you, Mr. Chairman.

Mr. WELDON. Would you recommend that we bring in someone—and I do not know any one group—but, say, like an Institute for Defense Analysis (IDA), or somebody, to step back from the acquisition process and to come in and look at that?

In other words, over a 10-or 20-year period, estimate realistically, not pie in the sky pipe dreams, realistically what is going to be the funding available for tactical aviation?

And have a range of funds, a low range and a high range. And then based on that, do what you are suggesting, which is look at the mix based on the—

Mr. LI. I think IDA, probably, and many other groups, think tanks, have done something like that already. I know that we have been in that area where we have identified what are the needs in the future.

Mr. Chairman, the difficult part is who is going to make the tough choice? It is not a matter of identifying the issue. I think a lot of people know about the issue.

You were talking about the train wreck—they know about that. Let's make those difficult choices—we have to make them now because we are making decisions. These things are getting close to bending metal and going to production.

Mr. WELDON. So this may be at a blue ribbon level reporting to the secretary. Perhaps, even though Congress tends to not want to make tough decisions, we could assemble a team, which you all will be involved with, and maybe you can make some other recommendations for us. And perhaps, we could assemble at the congressional level a team that would step back and look at this in an objective way.

Because, again, none of us want to cancel any program. I mean, I did not want the Comanche canceled. I lost hundreds of jobs in my district with the cancellation of Comanche, but I am not oppos-

ing that, because you cannot fund the Comanche and the V-22 and all these other programs. So, something has to give.

And I am concerned about the industrial base. We have not talked about that. That is in your report. Our industrial base issue is a very real and genuine issue.

You were going to add something there before I——

Mr. SULLIVAN. To try to answer your question another way: I mean, we all know how complex these acquisitions can be and the acquisition process itself can be, and in fact the requirements generation process that DOD goes through.

We have done a lot of work in the private sector looking at how they do things, some best practices work and things like that. And I would say in the past 18 months or so, DOD, with its acquisition policies, has moved in this evolutionary, knowledge-based kind of direction with its policies that we find to be a better way to be able to predict costs on product developments like Joint Strike Fighter and F/A-22 coming out of the box.

And if you can get a program in a position where you have a business case at the outset of that program—both of these programs we are talking about today began with business cases, at least the resource-side of the business cases began with development and procurement funds estimates that were really not very stable, as we can see. The F/A-22 has doubled and Joint Strike Fighter has gone up a lot too.

It takes a lot sounder estimating at the beginning of the program, which means requirements have to be probably more realistic, there has to be more incremental approaches, probably, to building these weapons systems.

A more reasonable business case at the outset of these acquisition programs would help a lot to make those policies work.

Mr. WELDON. Thank you.

It just underscores perhaps the most important message of this hearing, to the contractor base: understand the pressure we are under and you better maximize your efforts to control and cut costs while giving us the best possible quality. Because if you do not do that, this train wreck is going to impact your bottom line and your ability to produce your product.

With that, I will turn to my colleague, Mr. Smith.

Mr. SMITH. You know, we have talked a little about what would happen if we canceled the programs and everything, F/A-22, Joint Strike or F/A-18E/F.

But from hearing what you said in terms of where we are at and in terms of our contractual commitments, certainly on the F/A-22, it also sounded like, if I was reading your comments correctly, even on Joint Strike we have contractual commitments that have put us pretty far down the road.

Are we even in a position to contemplate that? Are we not at the point where we have jumped and now we are trying to fill the pool up with water before we land?

There is no turning back. We are at the point now where it starts to be cost-effective to buy these things. We have done the development, we do all that, and then we get to the point where we buy one wing and then when we start to get a greater return on our dollar, we stop.

Help me out in terms of how that would work out.

Even if we hit the brick wall that the chairman has correctly identified, we just flat do not have the money and we are trying to back out of it. It strikes me that it would be a pretty big disaster, because we would have wasted all this money and now we are not getting the benefit.

But how would that even work? We are much further down the road than we were even with Comanche at this point.

Mr. LI. The F/A-22 is at a different point in its life than the Joint Strike Fighter. The F/A-22 has been in the low-rate initial production, and that is the reason why we have about 50 of them and we will soon have 70 of them.

On the JSF, they are still in development. And in that particular one, the complexity of it, trying to build three variants using one basic configuration is extremely difficult, especially when you consider—Mr. Schrock, we have discussed this before—when you have a short take-off, vertical landing type of aircraft and one that is a conventional landing and one for carriers, that is extremely difficult.

Mr. SMITH. We had a hard time building the one variant of the F/A-22.

Mr. LI. Yes.

It is not in production. We do have these commitments. They are commitments made by our international partners on the range of \$4.5 billion, and we know that if this thing does not go further, that would be a death nail for future cooperation with our allies. I think that is an extremely important thing.

We have a credibility issue here also.

Mr. SMITH. Plus, the Joint Strike Fighter fills a lot of requirements. It is a lot of different—what?—I think it is 2,400 planes now we are talking about getting.

Mr. LI. Yes, sir.

Mr. SMITH. I mean, to pull out of that, we would have to do something to try to make up for that.

I am sorry, you had a comment?

Mr. SULLIVAN. With regard to the Joint Strike Fighter program where it is in development now, obviously that is a lot earlier in its development.

And I think some of the things that we have seen recently, that the program is contemplating, are things really that—there are some very hard decisions that I think they are getting ready to make at a time in the program that we feel we need to look at this a little bit more closely.

But this may be the most appropriate time for them to actually be looking at things like—you know, the design weight of the aircraft right now is becoming a big issue. That needs to be dealt with as soon as possible.

That is a tough thing to do for these programs in the environment that they operate in.

But really, if they are given the time to do that now and solve problems now, we tend to believe—I think this bears out on the F/A-22, for example. They had similar problems. Once they got further along in development they were dealing with design issues

that cost them probably a lot more money and a lot more inefficiency with their time than they would liked.

So in a way, the Joint Strike Fighter is in a position, if managed properly, to maybe solve some of those problems early. But those are tough choices that have to be made now in a program like the Joint Strike Fighter.

Mr. SMITH. Quick questions on the F/A-22: what is its mission at this point? When it came out, as I remember it—and the chairman is right, I was the first chair in 1997 and people were asking these questions, most prominently Chairman Weldon, and it is one of my first memories of the Armed Services Committee is these very difficult questions about what to do about all these different TACAIR programs.

But it was supposed to be an air superiority fighter.

Mr. LI. Yes, sir.

Mr. SMITH. Basically, we were going to fight off all those other planes up there, dominate the air.

Well, things have really shifted. I mean, who out there is going to be fighting us in the air anytime soon plane to plane? In light of that, I guess, what is contemplated the mission of the F/A-22?

Mr. LI. When the F/A-22 was first conceived as the ATF fighter, you are right, it was an air-superiority, air-dominance aircraft. We were worried about Soviet bloc aircraft coming in large numbers.

Since then, the threat has changed. And I will let DOD witnesses tell you about this. But the concerns that they have now are not only in the fighters themselves, but also in other threats, such as the missiles, the guided missiles and cruise missiles, that potential adversaries may have.

Mr. SMITH. But the F/A-22, frankly, was not designed to deal with—

Mr. LI. Not originally.

Mr. SMITH. I could be showing ignorance on this—did we not add the A here not long ago?

Mr. LI. Yes, sir. Yes, sir, a few years ago, it became the F/A to stress the attack capability.

Mr. SMITH. Can you really do that, by the way? I am not sure how the design works, but if something is designed to be a fighter—

Mr. LI. Well, the F/A-22 always had an internal capability to carry bombs. That is not something new. But some of the new things that they are trying to do—in terms of hitting moving targets, as you know, in past wars we have had concerns about things being mobile, assets that the adversaries having that would be mobile, and the F/A-22, when it would be enhanced, would have those capabilities.

Mr. SMITH. The last question is something I asked about in the opening, and maybe this is just the way it has to be, but to go from the point when we start a program to the point when we actually use it, to have such an incredible spread of time, 18 years, I mean, that is staggering.

Now, a lot has happened during those 18 years, I think perhaps unprecedented in history, in terms of the changing nature of the threats that we face.

But it seems almost impossible to properly design a plane over that long of a period of time. Things are going to change. Is it possible to compress that? Because if you can get it done in five or six years, you are within the time frame of your planning.

But if you plan something, and all this time passes, I mean, putting aside for the moment the threats that were out there, just the sheer development of technology, think about where we were technologically in 1985 and 1986 and this is where we are now, we obviously built something different.

I guess I am asking: Is there anyway to get around that?

Mr. LI. Mr. Smith, that is an issue that many people have looked at, and GAO has really tried to look at many of those issues associated with, "Let's try to understand why is it taking so long?"

And Mike Sullivan, on my left here, he has done so much work in the best practices area, so I would like for you to briefly explain that.

Mr. SULLIVAN. Well, we have done a lot of work looking at product development and technology development and the issues they have with transitioning technologies on the products and things like that.

And in fact, we worked fairly closely with the department when they were working on their acquisition policies and trying to solve the exact problem that you are talking about.

In other words, 18 years from conception to fielding the product is not doing a whole lot for the war-fighter right now.

So, that is where all of the new policies stress evolutionary acquisition and knowledge-based acquisition and having a more vibrant tech base perhaps that is more relevant.

Mr. SMITH. Well, could we not build a few of them, "This is what we can do right now," boom, let's build it. I would think it would be pretty good, even it was based on 1988 technology, and then we will try to upgrade it.

Mr. SULLIVAN. The idea, I think, with the evolutionary-type policies that they are trying to perform now is to—you know, this is where the requirements process and the acquisition process tie together.

So they have been looking at the requirements process as well. You know, we have the operational requirements documents on the old systems. They have put in place a new process that would look at the quantum leap, where you would want a weapons system to get to and write a document for that, but then break that into increments that are manageable as product developments with available technologies, and then try to, in an incremental way, make that revolutionary leap.

So in other words, if you took something like the F/A-22 and you looked at the key performance parameters of that, which our Stealth and super crews clues, high maneuverability range and things like that, you could break that into maybe, perhaps five-year increments and try to build a plane that eventually gets to that.

In some ways it makes it more complex, but in some ways it makes it a lot more simple and makes a business case for something that you can deliver to the war-fighter in some relevant time period, a lot of easier to do.

So if you do that, you have to pay a lot more attention to your technologies as well.

Your S&T community has to get a lot more disciplined also.

But I think right now the department, at least policy-wise, understands that and is trying to move at the way. And it is just awful difficult to drive that all the way through the organization.

Mr. SMITH. Thank you very much.

Mr. WELDON. I thank the gentleman.

Dr. Gingrey is recognized.

Dr. GINGREY. Thank you, Mr. Chairman.

I just wanted to make a comment in regard to the—the chairman mentioned, of course, the cancellation of the rotorcraft, Comanche, and I guess by way of implication that that should be a wake-up call from the Department of Defense that any major program at any time could be canceled.

This is just in the way of an editorial, I guess, but it seems to me that the Comanche was canceled because, based on the experience and Operation Enduring and Iraq Freedoms, that it was not fulfilling the mission that it was designed to fulfill.

And while there may have been some problems in regard to production and cost and all of these things that the GAO is pointing out to us in this report on the F/A-22 and the Joint Fighter, my understanding of that absolutely is not the reason that the Comanche program, \$6 billion into it, was canceled, but rather that was just not—based on our recent experience in-theater it was not going to do what it was designed originally to do.

And I think that in some ways, it actually makes a stronger case for these tactical fighters that we are talking about here today in this hearing, the F/A-22 Raptor and the Joint Strike Fighter, because of the same experience and the number of advancements of SAMs and capabilities of the bad guys to shoot down our planes.

From my perspective it seems that it is also making the case for going forward.

And I really appreciate the work that Mr. Li and Mr. Sullivan have done in this good report, and it is something that I think we need to have on an annual basis, and I commend you for that.

And your response to the questions for Mr. Smith and from the chairman in regard to what would happen if, I think you answered that question very clearly to my satisfaction.

Specifically, I want to ask you, though, regarding the figure that was originally in the GAO report that was released on the 15th of March about the F/A-22.

The report says, and I quote, in order to develop the expanded air-to-ground attack capability—that we talked about a few minutes ago—the office of the secretary of defense estimates that the Air Force will need —and you changed this figure; I think originally it was \$11.7 billion and I think I heard you say \$8 billion today—in modernization funding.”

However, in your written testimony, you also state that the Air Force estimates that they will only need \$3.5 billion for that modernization effort.

Could you comment specifically on the \$11.7 billion, or \$8 billion, versus a \$3.5 billion figure?

And how did OSD and the Air Force generate their numbers? How will the money be spent? And generally speaking, is the \$8 billion an accurate figure in your opinion?

Mr. LI. I absolutely can answer your question, sir.

The basic issue is: It will take over that \$11 billion in order to have modernization for the F/A-22.

When I talk about the \$8 billion, it is the \$8 billion in addition to what the Air Force has already in their program. They have through 2009 \$3.5 billion. So when I refer to \$8 billion, that is the incremental that gets you up to the \$11 billion—that is the reason.

They have modernization funds accounted for through 2009. The entire modernization program, which includes the ground attack capability, which the CAIG did estimate, includes the entire modernization that goes beyond 2009—that is the reason.

Dr. GINGREY. Mr. Chairman, that is my only question for this panel.

But again, Mr. Li and Mr. Sullivan, I appreciate it. I think the report is an excellent report, and we will look forward to continuing to work closely with you.

And I commend the chairman for having this hearing and emphasizing, again, as he always has, the importance and the need for diligent oversight on our part and to make sure that we control cost.

If we get a second line of questioning, Mr. Chairman, I may want to come back and ask about this knowledge-based concept.

Because the implication in your report about knowledge-based purchasing, it makes it sound like that some folks were just flying by the seat of their pants and there was no knowledge at all. And I would like for you to explain that concept to us, so maybe in the second round.

Mr. WELDON. I thank the gentleman.

Mr. McKeon?

Mr. McKEON. Thank you, Mr. Chairman.

I get very frustrated in a hearing like this when we hear these kinds of figures and reports.

Being the oldest Member of this committee here, I remember World War II just as a very small infant. But we go through World War II, Korea and up to the present time. I also watched the B-2 go from—what?—120 or 130 aircraft down to 21, and it was pulling teeth to get that last one.

And all of this hearing, it seems like we are talking all of our money just for tactical air, and when we see where the B-52s are and the B-1B and the B-2s, it is like we are going to, at some point, have one plane left and one pilot, and then heaven help us.

And I look at where the Pentagon was built in one year, and I look at the number of planes that were built in World War II. Granted, we used to talk about 80 planes to hit one target, now we talk about one plane to hit 80 targets.

But I get, as I said, very frustrated.

I have been in Congress now 12 years. I thought if we could get our blue suits, our green suits, our brown suits, if we could get everybody together to really look at what we see is going to be the threat in the next 10 years, 20 years, 30 years, and forget all kinds of interdepartmental or interservice rivalries and say, "How is the

best way to meet that threat?" and eliminate all of our prejudices and come down to what is the best way to target that.

But I guess the problem is, by the time we get to the expertise to be able to really come to that answer, we are pretty ingrained in one of the services or one of the departments and look at it kind of with blinders on.

Mr. Chairman, I commend you for holding the hearing.

And I commend you, gentlemen, for your report and the work you have put into it, and all the people who are going to speak on the next panel.

But I do not see a way to end the frustration. Because I think our country has gotten so ingrained in bureaucracy that everything takes forever. I mean, we are talking 15 years and we do not have a plane to the war-fighters yet?

World War II lasted five years. And we were developing planes, we were developing them, getting them to the war-fighters almost overnight in comparison with what we are doing now.

But now, by the time we get through all the environmental restrictions and get through—plant 42 is in my district, and to build a building where you can build a plane, it takes forever because of all the restrictions you have before you can even get the building built to meet all the environmental restrictions.

And all the permits and everything, we have just made everything so complicated and so difficult.

I was watching those hearings yesterday on 9/11 trying to decide—an inordinate amount of time we are spending trying to decide whose fault it was instead of how do we fix the problem and how do we move forward from here?

I see a lot more problems than I see answers. And until we can get to that point I guess where we all sit down and really see what the threat is, how do we best meet the threat, and really are able to sell our case to get the money that is needed to accomplish that, we are in serious problems. We need to learn how to face these problems.

And like I said, I see more problems than answers.

We have got a lot of smart people in this room, but we bind ourselves with being politically correct or being all the different things that we—barriers that we throw in front of ourselves to really solving the problems.

I am glad you are there, Mr. Chairman, I hope you can come up with the solutions.

Thank you.

Mr. WELDON. I thank the gentlemen.

I cannot cancel anymore programs in my area, though. They are dwindling down.

Mr. Schrock is recognized.

Mr. SCHROCK. Thank you, Mr. Chairman.

Thank you, Mr. Li and Mr. Sullivan for being here.

I have been sitting here listening to all the discussions, and I share my friend from California Mr. McKeon's frustrations, and I certainly identify myself with most of the remarks that Mr. Weldon and Mr. Smith said.

I have very recently spent some time with the senior Air Force leaders to discuss the priorities and their vision for the future of the programs that is going to shape the Air Force tomorrow.

I am also aware of the steady flow of criticism and second guessing that surrounds the mature Raptor program and even the relatively young Joint Strike Fighter program.

And like many of my colleagues, I am frustrated with our nation's ability to design and procure new defense systems and do it in a timely manner.

And I have gotten some briefs on the Raptor program that I believe made a very compelling case for the continuation of the program and fielding that system as quickly as possible.

And I believe the case was compelling that the technology necessary to ensure continued air dominance is not something we can develop in a few weeks or something we can afford, as a nation, with global commitments to be without.

I read some of the information here, the first prototype of the Raptor flew in 1990, the plan development schedule has grown from nine to 19 years, and the initial operational capability date slipped nine years.

And I understand there are avionic software programs, and I try to figure in my mind how we can tighten up some of those time lines. And I am going to use a Navy example.

Admiral Vern Clark has been a strong advocate of the new LCS, littoral combat ship. And he tells us, and he told us again yesterday he needed it this morning at 0800. And he wants to get it into the water as quick as he can, and he is going to do it with plug and play systems, so if you have to tweak the system from time to time, you can do that.

And I absolutely am on board and support him totally in that.

But I read people saying, "What is the big hurry, what is the big hurry?" Well, that just flies in the face of everything we are hearing here.

I think he is right. And I understand a Navy platform is certainly different than an air platform. If a Navy ship breaks down, it does not kill anybody. But if a plane breaks down, it does.

And we simply have to get some of those time lines shortened.

And I understand they are design problems.

And one thing that I was bothered, I think Mr. Li, you said this, you said we need to buy them in the quantities we can afford. Well, maybe we can only afford one, but the threat tells us we have to afford 501. So I am really confused on that issue.

And are we ever going to build a perfect platform? Probably not.

And Mr. McCain said that it would be nice if we could look at the threat 20 to 30 years from now. That is virtually impossible, that is absolutely never going to happen. If we try to develop a platform based on that, we are just fooling ourselves.

And the threat does change everyday, and that is why some of these programs have taken so long to get online.

So my question to the first witnesses, and I am probably going to ask General Keys and Dr. Sambur the same thing: From the standpoint of the air crew survive ability and assured air dominance, do you believe that we can afford not to continue to procure and field the Raptor?

And as we continue to develop the Joint Strike Fighter, can we avoid some of the problems and pitfalls that have become commonplace in prolonged procurement programs? And can we make this process better?

It seems that we just have to shorten the——

Mr. LI. Absolutely. The affordability issue that you raise is more in line with risk than dollars. I think that is how I am reading your point.

And I absolutely agree with you, there are risks out there.

I think our message is that, recognizing all these risks, but you have to recognize and you had mentioned that the Navy has a requirement, the Air Force has a requirement, they have a requirement on aging aircraft tankers, the mission aircraft—all of our services need it.

And as I said in my short statement, I believe we need to field the best weapon systems for our brave men and women in our armed forces. But that is not the issue, I got to have the money to pay for it.

So the tradeoffs that have to be made by elected officials is: Where do we put that money?

That is what I am raising as an issue.

Mr. SCHROCK. And will we ever get the best platform if we keep these time lines going? And whose fault is it? Is it the services? Is it the contractors? Or is it Congress?

I have a feeling it is from that desk back here is where some of the problems lie. And how do we get our hands around that?

Mr. LI. The requirements that are established a lot of times are established in conjunction with the contractor because they know what the capabilities are.

However, as Mr. Chairman was talking about on the threats, the threats have changed, they are changing, and the Air Force is trying to accommodate those with some changes to their program.

Mr. SCHROCK. But if we try to build today for the threat tomorrow that we do not know, we better stop building because we are never going to get there.

And I just do not understand—and I share Buck McKeon's frustration—why does it take so long to get these things done?

Mr. Sullivan?

Mr. SULLIVAN. Yes, I think Mr. Li is right on a point there.

I mean, it really does go back to the requirements. You know, we continue to emphasize this idea of business case at the outside of a program. And there are two sides to that: There are the requirements and there are the resources.

And we also have emphasized over and over again that requirements in the past—and, you know, I think requirements have tended to be very, very high-performance-type requirements that are very inflexible. And that will tend to drive a quantum leap kind of a program to long schedule delays and costs.

So it does begin with the requirements.

And I think that you are right. Are we ever going to get a the 100 percent perfect capability? You could probably get it for 1995 by 2015, but threats change.

I think you need to be a little more—flexibility on both sides of that business case, both the requirement side as well as the resources side is one way to start to address that.

Mr. SCHROCK. And I hate to keep referring back to Admiral Clark, but Admiral Clark wants the perfect platform as well. But he needs it right now, and he wants to do plug and play so if things change, they just go out and take out one module and put in another.

Now maybe it is not that easy for airplanes. I do not know. I did not drive airplanes; I drove ships.

And I just need to understand if that is possible. And if it is, then there is really no excuse for this time line being so long. I just do not get it.

Mr. SULLIVAN. One subset we are talking about here that is interesting is the idea of those open systems. I think if you do start to design things with more open systems, that is one way to keep up with requirements as technologies evolve. And there is not enough of that right now probably on these weapon systems.

Mr. SCHROCK. But the chairman said that the train wreck is on it is way. Frankly I think the train wreck occurred at 0847 on 9/11/01.

Mr. WELDON. The gentlemen is correct, been there.

Mr. SCHROCK. Thank you, Mr. Chairman.

Mr. WELDON. Mr. Forbes is recognized.

Mr. FORBES. Thank you, Mr. Chairman. Mr. Chairman, I thank you for the work you have done in this area and for continuing to keep the focus on these crucial issues.

Mr. Li, Mr. Sullivan, thank you for your efforts.

And you know, Mr. Schrock said something about the fact that we will never get the best systems possible because that is constantly a moving target.

But I want to just come back to something you said about what the other panelists are going to be saying.

They are going to be saying that we do not want to have a fair fight, then you said we need to set our priorities. And not picking on semantics, but that is our priority.

Our priority has to be to make sure that we do not have a fair fight out there. And I am just convinced when you just pick something as simple as the F/A-22, that if we are going to maintain strategic air superiority, we have got to have that aircraft, to have that strategic air superiority.

Like everybody else, you get frustrated with the time line, that is what Mr. Smith talked about.

But I am concerned, kind of moving into frustrated, and almost at appalled at the cost that just increases from the time we start one of these programs to when we finish up, primarily from our contractors that I do not think always fully partner in maybe with the understanding that we have got to have some cost controls if we are going to get these products built.

And I do not want to try to do that on a macro basis, because I know we will just talk about the problem and never get any solutions.

But when I get almost anybody in this room in my office and I close the doors, they always tell me that the new creative tech-

nology, stuff we are getting quick and that we are really utilizing, is coming from some of our small, new start-up companies.

And my question to you is: What can we do to help those companies thrive more so that we can get that technology in cheaper and quicker and get it to our folks in the fields so that we do not have that fair fight?

Mr. LI. There have been programs—and I did this work several years ago, so my information might be slightly dated.

But there are programs in DOD, like the ACTD, where their main purpose is to try to bring to the war-fighter equipment and field things more quickly.

And one example, not the ACTD, however, but that goes directly to what you are talking about, is many years ago I did this review on the Army's land warrior. And the land warrior was, the soldier would in essence strap gear around himself, and the special guns and the cameras on the helmet, and what we found was, all this equipment would weigh 80 pounds.

You can imagine out in the field 80 pounds gets pretty heavy after a while. And as a result of that, they did go and ask for other concepts. And a smaller, more innovative company, other than the big company that originally developed it, actually came up with a much lighter version. And that is what they are going to be working on and fielding in the future.

So you are right. There is no monopoly on good ideas as far as I am concerned.

Mr. FORBES. And, Mr. Chairman, one of the things that might help us, and we do not hear—we hear that from everybody, the small companies have an opportunity to move quicker in some manner.

And as you heard Mr. McKeon saying, you know, sometimes we will sit here and debate a program or a system for five or six years, but we get in a conflict, all of a sudden in a week or two weeks, we are resolving it.

At some point in time we just need somebody to tell us: These are the procurement problems. If you remove this hurdle, this hurdle, and this hurdle, we can move it quicker and we can move it cheaper, so we can at least make a dent in that problem.

And you know, we would love to hear your comments even now or sometime in writing on any of those that we might be able to move in some fashion to move that whole situation along.

Thank you, Mr. Chairman.

Mr. WELDON. Thank the gentleman.

Mr. Simmons?

Mr. SIMMONS. Thank you, Mr. Chairman.

A couple of questions.

First of all, in the committee analysis on page four, it says, and I quote, the propulsion program for the aircraft is meeting planned schedules and costs.

Is that a correct statement?

Mr. LI. Yes, it is.

Mr. SIMMONS. And the propulsion program is primarily U.S.-based. Is that UTC Pratt Whitney engines?

Mr. LI. Yes, sir. Yes, sir.

Mr. SIMMONS. And that is U.S.-based?

Mr. LI. Yes, sir.

Mr. SIMMONS. Okay. A second question: on page 5 of the GAO testimony, the statement is made that the basic mission of the F/A-22 initially focused on air-to-air dominance and has changed to include a significantly greater emphasis on attacking ground targets.

My dad was an architect. He practiced architecture for over 50 years. He designed and built hospitals, which are pretty complicated.

And he said the greatest contributor to the cost, increased cost, in designing a major urban hospital, such as in New York City where he practiced, was change orders, and that the same thing applies to even a house, a residence, a dwelling, that the change orders kill you.

And it seems to me right off the bat that there has been a major change in the concept of this aircraft. Do you agree with that? And has that contributed to the cost increase?

And then I have a third question.

Mr. LI. There has been a major change. The increase in funding that is required in the future is for what the DOD will call the latest spirals associated with that.

They will be able to do a ground attack mission without making those changes. However, to get the ultimate, they would have to replace their processors, they would have to change the computer architecture associated with it.

Mr. SIMMONS. You know, and I am not an Air Force guy, I am an Army guy, I am not a flyer, I am a guy that sits in holes, but it looks to me like we have had a major change in the mission of this aircraft over time, and that has probably contributed to the increase in costs.

Let me add to that, if you will, pages 14 and 19 of your testimony. This is a multinational operation. This is involving not only multi-services, U.S. types, but this is involving eight different countries.

Mr. LI. That's the Joint Strike Fighter, sir.

Mr. SIMMONS. I am switching to Joint Strike, in that case—eight different countries. And it just seems to me that the challenge of trying to work not only with multi-services but with eight different countries has to be huge.

You mentioned tech transfer issues, sensitive R&D technology issues.

You know, whatever happened to the idea that the United States of America would build aircraft, and we do it right here with our workers, our designers, our builders, our factories, our industrial base, and if somebody else, one of our quote, unquote, friends, you know, wanted to join us, they could buy some of our product?

You know, this is essentially I think what we do with aircraft carriers. We do not go to Italy and Norway and Denmark and the U.K. and get them all to, you know, do their six bits and give us a few dollars.

With submarines we do not bring in a half a dozen to a dozen countries and say, "What would you like?" "Well, we do not want a coffee maker. We want to make tea. You know, we want the submarine to have a tea maker," et cetera, et cetera, and so forth.

I mean what are we doing to ourselves here? I understand that \$4.6 billion is available from these partners, but that is really a fraction of the total cost.

And it seems to me that with the tech transfer and the R&D issues that that they are getting a lot out of this, we are getting very little.

And on balance, you know, the whole structure of this program is wrong.

And, you know, quite frankly, Mr. Chairman, I am looking at the same thing with a VH-92, with the Super Hawk, for the Presidential helicopter. Now we have postponed that competition another six months, maybe get it past the election.

But we are looking at a competition between the Sikorsky, 100 percent U.S. chopper for the president, versus some multinational version.

And I really wonder if we need to just back right back up and say, this whole concept is wrong. We need to maintain our industrial base. We need to maintain our workforce. We need to design and develop these things with a more specific mission of how it serves us.

And then if our friends want to buy in at a later date, let's bring them on in.

Is that a false analysis?

Mr. LI. I understand the point you are trying to make, sir.

Some of the benefits, however, that we should consider is the fact that the cooperation that we are getting will also result in the interoperability capability which I talked about.

But also, even from a technical standpoint, our British friends have a lot of experience with vertical takeoff and landing aircraft.

And the S/TOVL version, which is a short takeoff and landing version, is being worked on with British help. They are helping us design the lift fan that is attached to the main engine and it provides that vertical and takeoff capability.

So we are getting something out of this other than the financial aspects.

Mr. SIMMONS. And Denmark, what is their technical contributions?

Mr. LI. Well, I cannot answer that. I do not know specifically.

Mr. SIMMONS. Norway, anything from them? No?

Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentleman.

You know, there is really a simply analysis here that gets at the heart of our problem, and I use this frequently in speeches. The reason why we have a problem today is that we have increased defense dollars.

But if you look at what we are spending today versus what we spent, say 30, 40, 50 years ago, when John Kennedy was the President, we were spending 52 cents of every Federal tax dollar on the military. That was 9 percent of our gross national product. Today we are spending about 17 cents of the Federal tax dollar on the military, a little over 3 percent of our GNP.

When John Kennedy was the President, we had a draft. We paid our military personnel next to nothing. Today, quality of life is a major cost driver because we have an all-volunteer force.

When John Kennedy was the President, we had nothing called environmental mitigation. That is \$12 billion out of this year's defense budget to, in many cases, pay communities to try to find re-use strategies for old sites.

So the problem is, if you compare today versus what it was back then, it is impossible for us to do what we want to do, especially trying to compare to what we did back in World War II or another age when we were able to meet the modernization needs quickly.

And it is a frustrating problem for us, but it is something we have to come to grips with because we have to provide the answers.

Mr. Larson is recognized.

Mr. LARSON. Thank you very much, Mr. Chairman, and thank you for holding these timely hearings.

I want to associate myself with the remarks of my colleague from Connecticut.

And I only have one question for this panel. And I certainly appreciate the work that GAO does and the effort that you have put forward.

But what makes it difficult for policymakers is that we engage our armed services, we engage our companies, and we ask them to be cutting age. We ask them to make sure that they are able to produce the best possible equipment necessary to defend this nation.

And in the process, if you look back at the F/A-22, the Joint Strike Fighter, and what we required of our various companies at its inception in many cases were technologies that had not been clearly developed.

But we knew in terms of the optimal defense and our optimal capability for our armed services that we would need these requirements in the future.

So I am a little concerned that, noting that there are going to be problems and there are going to be trials that they go through, which you point out, but from the letter sent to the committee, we just received one page of the changes and conditions.

So I would like to ask unanimous consent, if I might, Mr. Chairman, to submit for the record, DOD's full response to the questions that GAO had raised, and just ask why you did not include the more fuller response on the part of DOD.

Noting that a lot of times the GAO is involved in looking at things, by the time you come up to the Hill to testify, a lot of these things have been worked through.

Mr. WELDON. Without objection, it is ordered and will be part of the record.

Mr. ISRAEL. Will the gentleman yield for one moment on this?

We did ask OSD, by the way, to have a witness here. They were invited to send a witness, but evidently the person we asked could not make the hearing, but they were invited to be here.

Mr. LI. I would like to respond, Mr. Israel.

Thank you very much for that question. It gives me an opportunity to talk about our quality assurance process.

Within our quality assurance process, when we produce a report, you know, draft report, it is provided, as you indicated, to the agency for comment. The DOD provided a comment, and their formal comment is one that I published at the back of the report.

The technical comments, and those are the ones that you refer to, are some that they identify as things that they want us to consider.

We made some changes based upon our appreciation for whether or not those were—and there was substantiation for those—if those were in line with some of the things that we had found during our work. We have made those modifications.

But in some cases, we did not because we did not think that the body of evidence that was provided to us during the course of our work justified them.

Mr. LARSON. Thank you. I will be anxious to hear from the second panel.

Mr. WELDON. I thank the gentleman for his questions.

My good friend, Mr. Ortiz?

Mr. ORTIZ. I do not have any questions for this panel at this moment. Thank you, Mr. Chairman.

Mr. WELDON. Thank you, Mr. ranking Member.

I know Mr. Schrock has a comment. I would just like to ask one other question, and I am going to be very blunt with this and I would hope that you would answer it in a very blunt manner, as well.

I am concerned, because part of my opening statement was the electronic combat mission area where we talked about four platforms, we are going from one platform, the E/A-6 to at least four—E/A-18, B-52, miniature air launch decoys and Joint Strike Fighter derivative. And there actually is a fifth, which is the Joint Unmanned Combat Air System.

And what appears to be, from our perspective, as I referred to it, the orphaning by the Air Force and the Navy of a \$700 million program to DARPA—\$700 million program taken over by DARPA.

I would look as someone who you might think is not an expert in this area that perhaps the Joint Unmanned Combat Air System could in fact help us with the cost factors in our tactical aviation programs that we are now having to debate and discuss for the future, in terms of maybe reducing costs.

Is there a bias that you see in the services against pursuing unmanned capabilities versus manned capabilities? Did you look at this enough that you could tell us whether or not that was a part of the factor as to why the Navy and the Air Force transferred this \$700 million program to DARPA?

Mr. SULLIVAN. You are referring to UCAV, or what is now called JUCAS. We did some work on that. I think we issued a report on that about a year ago.

And just briefly from our perspective, one of the problems that UCAV was having—we did not detect any bias on the part of the services against UAVs.

But again, I think you go back to the fact that one of the problems that the services were having, as they have oftentimes with joint programs, is a requirements issue, and also kind of a cultural issue I think in terms of trying to get performance.

You know, the Air Force wants basically an unmanned U-2 kind of a platform, and the Navy has a lot of Broad Data Maritime Surveillance (BAMs) requirements that they have to take care of, coastline requirements and things.

And what we saw happen on that was requirements really were getting ratcheted up to a point where it was becoming an unviable program.

And we saw really that DOD had a UAV task force that kind of was involved in that. We see some positive things that can come out of some perhaps new relationship between an organization like DARPA and the services.

But certainly services have to be an empowered partner with anything.

There are a lot of technologies that have to be managed for UCAV to work properly and to be able to make it through this evolutionary kind of knowledge-based acquisition.

And we saw some benefits to having an organization like DARPA in charge of that at this time, kind of a pre-acquisition manager of technologies, if you will, as opposed to an acquisition program.

But we would say that the services always have to be very well represented and with a lot of power on that team.

Mr. WELDON. Mr. Li, I am going to ask you to do something for this committee, and it is based on the confidence that we have in the work that you have done. And it refers back to what I said in my opening comments in my question.

I am going to ask you, since we think that you are unbiased and very technically competent, to put together what you would call your dream team of independent entities who could come together and look at the whole tactical aviation need and to make recommendations if we were to assemble, and I won't call it blue ribbon because that is too commonly used.

I am talking about a team that can step back for us, based on what the funding profile is going to be, both the low number and the high number, and the needs and priorities that each of the services have, their missions, and with the available dollars that—and I do not ever like to see a defense needs addressed by a budget number, that is always artificial, but in fact that is what happens.

And also to include in that—and this is not in particular your area—but the UCAV, the unmanned capability, and come back to us with what your recommendation would be if we had an independent assessment to be done, who would be a part of that.

You know what think tanks are specialized most aggressively in these areas. You know which ones have the expertise in working with the GAO.

Make a recommendation to us for a short-term look, not some lengthy, multi-year study, but a short-term look that we can benefit from. Maybe it won't be exactly what we need, but I think we could benefit greatly from that combined effort.

Mr. LI. We will work with your staff on that, sir.

Mr. WELDON. Mr. Schrock, you want to make another final comment?

Mr. SCHROCK. Thank you, Mr. Chairman, let me make one comment.

I cannot disagree with anything anybody has said up here today. But I do not know how many of you noticed what Mr. Forbes said that really rang with me, when he said there are a lot of small companies out there that come in his doors and they have developed programs or technologies that can do things better, quicker,

more efficiently, and they do not get much attention. And I know that to be the case.

The case I know about of a company has developed a piece of equipment that could be used for one of the service platforms that a big company makes, and the big company told the little company, "Our congressman is more senior than your congressman and it is not going to help."

I was the junior congressman. And that is true, I am junior, I know that, I am not stupid. But the problem is, that is the problem. We have got to let some of these guys get in there and show what they can do. And if they can do it quicker, they can do it cheaper, cost per unit, we ought to be looking at these guys.

And I do not blame the services for that. Not at all. That is our fault. That is our fault. And we need to get that under control. But how we do that is a mystery to me. But I absolutely agree with what Mr. Forbes said.

Thank you, Mr. Chairman.

Mr. WELDON. I thank my colleague.

And with that, I would say we conclude our testimony. Would GAO reps be able to stay around for the second round?

Mr. LI. Sure.

Mr. WELDON. We appreciate that.

We will now proceed to our second panel of distinguished military leaders, who we invite to the table. I have already introduced each of them, so we will just bring the panelists up.

And as our panelists come forward, I would again make the statement: Your written statement will be entered as a part of the record without objection.

And I would ask you to give us your verbal statements as succinctly as possible, yet making all the points you want to make, so that we allow maximum time for questions.

And we appreciate you all being here.

We appreciate, again, all of you being here. And for our men and women in uniform, let us just tell you again how proud we are of the job that you all are doing.

Almost all of us have been in-theater recently in both Iraq, Afghanistan, and we have seen the quality of our troops. And, as always, it is second to none. They are well trained. They are doing an outstanding job.

Our job is to give them, with the dollars we have available, the best technology that we can provide. We constantly fight for more. But, unfortunately, that does not seem to always win the day.

So given all that, we look forward to your statements.

We will start with Secretary Young. The floor is yours.

STATEMENT OF HON. JOHN J. YOUNG, JR., ASSISTANT SECRETARY OF THE NAVY (RESEARCH, DEVELOPMENT AND ACQUISITION) DEPARTMENT OF THE NAVY; VICE ADM. (VADM) JOHN B. NATHMAN, DEPUTY CHIEF OF NAVAL OPERATIONS, WARFARE REQUIREMENTS AND PROGRAMS, (N7) UNITED STATES NAVY; LT. GEN. MICHAEL A. HOUGH, DEPUTY COMMANDANT FOR AVIATION, U.S. MARINE CORPS; HON. MARVIN R. SAMBUR, ASSISTANT SECRETARY OF THE AIR FORCE (ACQUISITION) DEPARTMENT OF THE AIR FORCE AND LT. GEN. RONALD E. KEYS, DEPUTY CHIEF OF STAFF FOR AIR AND SPACE OPERATIONS, UNITED STATES AIR FORCE

Secretary YOUNG. Mr. Chairman, Members of the subcommittee, it is a great privilege to appear before the subcommittee to discuss the status of Navy and Marine Corps aviation programs in the fiscal year 2005 budget requests.

As you noted, Admiral Nathman and Lieutenant General Hough are here with me today on behalf of the Department of the Navy.

Your Navy and Marine Corps team's stellar performance in the Global War on Terrorism, Operations Enduring Freedom (OEF) and Iraqi Freedom (OIF), last year underscored the high return on investment in our combat readiness, our people and our unique maritime war-fighting capabilities.

As you know, the fiscal year 2005 request includes funds for 108 aircraft, reflecting the continuous successful efforts by the Department of the Navy to increase the number of aircraft we are purchasing.

Within these efforts, as has been discussed this morning, it is also important to improve how we buy aircraft and combat air systems.

The Congress's steady calls for jointness and discipline in acquisition and support of new initiatives has enable the Department of the Navy to take a different approach to contracts. I would like to emphasize some key examples.

Congress's support of multi-year contracts for F/A-18E/F, KC-130J and E-2C have allowed us to stabilize budgets and work with our industry partners to control costs.

The Department has worked to link incentives to performance in order to measure and reward performance and focus management attention on problems. Such incentives have helped the H1 upgrade program recover from a Nunn-McCurdy cost breach.

In new contracts we have worked to shift fee to the later phases of the program where we can more accurately measure and reward results.

Secretary Sambur and I have worked together successfully on Joint Tactical Radio Systems (JTRS), Joint Strike Fighter and C4 systems to further improve jointness and create joint programs.

Fiscal year 2005, the President's budget request attempts to balance continued recapitalization in obtaining new capabilities and reducing operating costs while simultaneously sustaining the legacy fleet aircraft that are performing magnificently in current operations.

We started to fully fund our aircraft production programs, while adding funds to develop important new capabilities, such as Joint

Strike Fighter, the advanced Hawkeye, the E-18G and the multi-mission maritime aircraft.

The Joint Strike Fighter, as was discussed today, provides naval forces with greater survivability, commonality, range and capability.

The air system preliminary design review was completed in June 2003. The first F-35 production engines successfully began testing in October. The short take off and verticle Landing (S/TOVL) lift system will begin testing in April.

And over 70 percent of the production drawings have been released for the first conventional take off and verticle landing (C/TOVL) air vehicle.

The Department decided to allocate approximately one additional year to the design effort in order to refine the three variant designs and deliver great capability to the war-fighter.

The V-22 flight test program is proceeding with discipline and continues to successfully demonstrate that platform's transformational capability.

The budget provides funds to sustain the P-3 fleet, which has been extremely active in contingency operations, as we also move ahead with the development of the multi-mission maritime aircraft to replace the aging P-3 fleet.

Finally, the broad area maritime surveillance system provides a multi-sensor, persistent maritime intelligence, surveillance and reconnaissance UAV, or unmanned air vehicle, that will be capable of operating in maritime and littoral areas.

The Department has determined that there are at least three candidates which can potentially meet the BAMs requirement, so the Navy is proceeding with a competitive program.

All these programs contribute to an integrated warfare strategy which relies on knowledge, persistence and precision to bring combat power to bear on an adversary at rates faster than the enemy's response and reaction times.

Even as we plan for the future, we are also focused on the challenges of today.

In support of the first Marine Expeditionary Forces return to Iraq, which is under way as we speak, and in support of deployed Marines in Afghanistan, the acquisition team has worked with 1-MEF to install aircraft survivability equipment on helicopters, to add armor kits to vehicles and to provide systems to address the improvised explosive device (IED) threat.

Secretary England directed the establishment of a formalized process we call Operation Respond to rapidly react to technological and material requirements generated by our deployed Marines.

A senior Navy and Marine Corps team chaired by Lieutenant General Hanlon and myself will review and coordinate technical and material requirements for deployed Marine units and utilize the engineering experience throughout the Department of the Navy and industry to expedite the best solutions available to counter evolving threats in-theater.

Mr. Chairman, out of respect for the subcommittee, I will stop, leaving much more to say. You and the Members of the committee have been key factors in all of this progress, and I offer my great

thanks on behalf of myself, the department and the sailors and Marines who rely on the equipment we acquire.

Congressional support of our aviation plan is essential to achieving the vision that lies ahead, and I thank you for your consideration.

[The joint prepared statement of Secretary Young, Admiral Nathman, and General Hough can be found in the Appendix on page 397.]

Mr. WELDON. Thank you, Secretary Young.

Before I turn to Dr. Sambur, this is for my colleagues and for our witnesses, I just got e-mailed and I expect that we will have a series of votes sometime between 11:15 and 11:45. There will be at least four votes and possibly five.

So the intention of the chair is, if we can do this, to finish the panelists—we only have one more witness—and then go right into questions and finish the hearing before that series of votes, because otherwise I think we will not have members return.

And so, keep that time frame in mind, that we want to finish before that series starts, which I would expect will probably be around 11:30, 11:45.

With that we will turn to Dr. Sambur.

Secretary SAMBUR. Thank you, Mr. Chairman, for this opportunity to discuss with you and your subcommittee the acquisition plans and status of our tactical weapons systems programs. Mr. Chairman, I request that my oral statement be made part of the official record.

Mr. WELDON. Without objection.

Secretary SAMBUR. Thank you.

Let me start with the F/A-22.

In the F/A-22 Defense Acquisition Board (DAB) this week, the acting Undersecretary of Defense for Acquisition, Technology and Logistics (AT&L) was “very encouraged by the program’s progress” and saw “no impediments to entering Initial Operation Test and Evaluation (IOT&E) in the April time frame.”

The program completed phase one of its operational testing on February 20, and while the Air Force’s operational test and evaluation center has not formally completed their analysis, the Air Force Operational Test and Evaluation Center (AFOTEC) commander characterized the jet’s effectiveness as “very impressive.”

In particular, during recent training missions with simulated air-to-air engagements, a force ship of Raptors has been clearing the skies of adversaries in a matter of minutes. In trials pitting four F/A-22s versus eight F-15Cs, all the adversaries were killed before a single missile could be launched from any of the F-15s, our current number one fighter.

The program has also made tremendous strides improving avionic software stability. Avionic startup is no longer an issue, and total system reboots that plagued the program last year no longer occur.

Overall stability has improved more than tenfold, with the stability measure of effectiveness now exceeding the required threshold of five hours.

The development program is nearing completion and there are just a handful of final details required before beginning IOT&E.

While the F/A-22 production delivery rate is not yet to our satisfaction, we are implementing numerous producability improvements that have pointed us in the right direction and have resulted in a more credible replanned schedule.

Although every delivery may not happen exactly as planned, we are very confident that total F/A-22 Raptor production will recover to the original schedule before Lot 4 deliveries begin.

As another piece of F/A-22 good news, we have reached verbal agreement on Lot 4 production for 22 jets, exactly on the required target price curve, showing that program stability and management attention pays big dividends.

On the munitions side, the Air Force successfully demonstrated the power up, data transfer, launch and impact accuracy of 80, that is 8-0, independently targeted 500-pound Joint Direct Attack Munitions (JDAMs) from a single B-2 bomber. In practical terms, this translates into the ability to destroy an entire enemy airfield in a single pass or to attack up to 80 individually, independent targets on a given sortie.

In addition, the JDAM program recently achieved the 3,000 kits per month milestone necessary to sustain peak consumption and replenish stock. This represents a two-fold increase in production rates and a little more than one year.

Your letter of invitation specifically called for some testimony on a couple of other topics. So allow me to touch upon those at this time.

The E-10A, on a wide body platform is the DOD's only—solution that satisfies the fiscal year 2004–2009 Defense Program Guidance (DPG)-directed and Joint Requirements Oversight Council (JROC)-approved cruise missile defense requirement. It is also a key node of the joint theater air and missile defense architecture, enabling rapid joint decisionmaking to shorten the kill chain.

The needs for this capability, with its reduced operational legacy, was illustrated in Operation Iraqi Freedom where soldiers had 1.5 minutes to detect, decide and engage Scud missiles, in contrast to the 4.5 minute time line experienced in Desert Storm.

The E-10A program was realigned to fully fund the Multi-Platform Reader Technology Insertion Program (MP-RTIP) sensor development with an existing budget and will deliver the first two aircraft by 2012.

This year we began our airborne electronic attack program. Airborne Electronic Attack (AEA) is to be a system of systems that provide critical nonkinetic standoff and close-in capabilities against threat radar systems.

Components include the B-52 SOJ for standoff jamming, the EA-18G for close-in jamming, the EC-130H compass call for communication jamming, and the MALJ for penetration jamming in concert with deep-reach electronic attack JUCAS.

The B-52 standoff jammer is a fiscal year 2005 new start program.

With regards to the intersection of the 2002 aerospace communication recommendations, an Air Force acquisition, I am happy to report that in many cases we are already headed in the same direction.

For example, the commission recommends endorsing the use of spiral development, which happens to be the preferred Air Force approach to acquisitions.

The Air Force views this as the best way to transition capability to the war-fighter fastest with the corollary benefits as expressed in the commission's report.

As for the long-term concerns about competition and overall health of the industrial base, we believe the Air Force is still well supported by the industrial defense industry.

We will continue to balance this need for competition with the need to support domestic sources as dictated by law.

Additionally, in those areas where there is an immediate concern about the availability of domestic sources, we participate in the DOD approach that calls for establishing a trusted foundry to ensure a source is available when needed by the department.

In closing, I wish to reiterate that Air Force acquisition has had a very successful year.

And General Keys, the operational individual from Air Force and I are very glad to take your questions at this time.

[The prepared statement of Secretary Sambur can be found in the Appendix on page 411.]

Mr. WELDON. Thank you, Dr. Sambur.

I am going to ask one question. I have to apologize. I have to leave briefly at 11 for a quick appearance, and Dr. Gingrey is going to take over the chair during that time period until I return.

But I have one question I want to ask and this is to, well, it is to all of you, but it is aimed mainly at the Air Force.

Because as reported in one of our publications today, Air Force Secretary Roche suggested to the Appropriations Committee that the Air Force's support for Joint Strike Fighter may decline if the program cannot overcome design difficulties for the STOVL variant, considered the most technologically challenging.

What is the Air Force's alternative if the Air Force basically has a problem in supporting the Joint Strike Fighter? What is the solution for the Marines?

Secretary SAMBUR. Are you asking the Air Force?

Mr. WELDON. Yes, the Air Force, because Secretary Roche made the statement.

Secretary SAMBUR. I would like General Keys to handle that as the operational end of this.

Mr. WELDON. It is on you, General.

General KEYS. It is a fair question. And the answer is, if we cannot build it we are not going to buy it. So if it does not meet the specifications, I do not think my Marine colleagues would be interested in an airplane that would not meet their qualifications.

Mr. WELDON. What should the Marines do?

General KEYS. Excuse me?

Mr. WELDON. What would the Marines do then, if we do not—

General KEYS. I would have to ask them exactly what their approach would be.

Mr. WELDON. I would too, but since Secretary Roche made the statement, I think, since we are all one military, we ought to also look—since the Marine Corps considered this to be one of their top priorities. I will ask the Marine Corps.

You have heard the statement of Secretary Roche that if we cannot work out this design problem, then perhaps the Joint Strike Fighter is a program maybe that the Air Force cannot support.

General, what do you say, or Secretary Young or Admiral?

The Marine Corps, what would you do if the Air Force, in its own wisdom, decides that we cannot overcome this technology issue?

General KEYS. Well, sir, I would like to just clarify.

We have no intention of making a separate bolt from the barn on this. I mean, this is a joint program and—

Mr. WELDON. That is why I asked you to respond and you said you would have to ask the Marine Corps.

General KEYS. No. What I said was, if it does not work, none of us are going to buy it.

Mr. WELDON. Well, obviously we are not going to buy it, either.

General KEYS. Now, if we cannot buy it, if we cannot make it work, then the question of now what is the backup plan, we know the off-ramps that we believe that we have for the Air Force fighters that we have.

The off-ramp for the Marines is an off-ramp that I am sure they are looking at and are prepared to build.

Mr. WELDON. Here is my concern, General, and I will get right to the nut, which I frequently do.

If push comes to shove, I think the Air Force would take the F/A-22 over the Joint Strike Fighter—if push comes to shove, and one of those programs is going to be canceled.

And if that becomes a decision, and if the Air Force decides—maybe that is not the case. Maybe it is an equal support.

But my gut feeling is the Air Force would go for the F/A-22 over the Joint Strike Fighter if we had to cut a program this year or next year or over the next five years.

That leaves the Marine Corps, then, in a bind, and so my question is: What do we do with the Marine Corps?

Secretary SAMBUR. I think, if I can just elaborate a little bit, I think that the issue that Secretary Roche was talking about was hypothetical. It is basically—

Mr. WELDON. Well, they are all hypothetical, but they are all based on—the Comanche decision was hypothetical a year ago; it is a reality today.

Secretary SAMBUR. Well, I think if you use the word reality, the F/A-22 is a reality. We are flying the F/A-22. It is not, to use an expression, a viewgraph presentation, which the JSF, not to imply is. And I would just indicate to you I think we will get there.

But the fact of the matter is, I cannot comment on his statement.

The F/A-22 is reality. We are seeing very impressive results. It is in training. It will start IOT&E. It is several years ahead of the Joint Strike Fighter.

So Dr. Roche comments are basically intended to indicate that if you want to make that analogy—because the F/A-22 is here, but we are not pulling away from our commitment with respect to Joint Strike Fighter.

Mr. WELDON. Dr. Sambur, can the Marines use the F/A-22 to complete their mission requirements?

Secretary SAMBUR. No, the Marines cannot use the F/A—I cannot speak for the Marines, but—

Mr. WELDON. If we have to make a decision and push comes to shove—and I have seen this before 100 times. I saw it when the B-2 program—we were not able to fund it and so there were tough decisions had to be made.

My gut feeling is, the Air Force would take the F/A-22 for exactly the reasons you mentioned.

But that leaves, if we listen to the Marine Corps and the Navy, a mission that goes unfulfilled.

We cannot make that decision in a vacuum because this airplane is here, if the Marine Corps tell us they have to have a platform to meet their mission.

And so I am asking for you what the response is, based on the testimony of Secretary Roche.

Any of our three friends from the Navy, the Marine Corps that want to answer the question can chime in.

And I know this is a perhaps putting you on the spot, but that is what we have to hear.

You put us on the spot all the time, dollar-wise.

Secretary YOUNG. There is nothing we see that says the Joint Strike Fighter will not work. The Joint Strike Fighter enables concepts of operations that none of today's legacy aircraft can accomplish.

Will we potentially go through additional problems and will we compromise to a small degree some of those operational contests? We may have to sit down and have that discussion. But those contests are not enabled by any of today's fighters.

So when we encounter some of those challenges and work our way through them—that was the decision that was made this year—it is in the interest of the department to spend money on something that will provide 2,400 airplanes for three services, as opposed to the other options that do not accomplish that broad a span and those quantities.

This plane, Joint Strike Fighter, will fight in the 2040–2050 time frame. All the options, aside from that, would lead the services to fly 1980's technology-type aircraft in the 2040 time frame.

Mr. WELDON. Don't get me wrong, Mr. Secretary, I strongly support the Joint Strike Fighter. In fact, I think it is the way we should be going.

I think it is ridiculous that each service has its own program if we can in fact find a common ground that meets all the needs.

But you heard what the secretary said—and this is going to be the argument—the F/A-22 is here, we are flying it. This is just a viewgraph, to use the word.

And the point is, Members will grab onto those statements and that will be what we have to deal with in the Congress, "Well, the F/A-22 is here, we have got labor unions who are building it, we have got companies who are building it, and this Joint Strike Fighter program, well, it may happen."

But you do not have the political clout to support something that is—maybe three years from now versus what is here—and that is a practical reality we have to deal with. We have to deal with that and that is a reality.

General, I will give you a chance to make the case, and, Admiral, you also.

Secretary SAMBUR. Mr. Chairman, may I just——

Mr. WELDON. Well, let them answer first and then you can respond, Dr. Sambur.

Yes, General?

General HOUGH. Sir, the Joint Strike Fighter is going to serve the needs of a lot of people around the world. There is no hard cash to build another one outside of what has already been built. That is the future, that is number one.

Two, S/TOVL airplanes: Unless that F/A-22 can hover, I cannot use it. The reason is: For fifty years, the Marine Corps has had no S/TOVL force which gave us the flexibility to be expeditionary from the sea with the flexibility of air-shore.

That concept with the Model T, which was the AV-8, has worked impeccably well. It is the future, without a shadow of a doubt, to be able to land on five times more runways throughout the world in these very crude places that we have to go to.

Just to give you a quick example of why the need for this airplane is crucial for the Marine Corps and the way we do business from the sea: It is a MAGTF, Marine Air/Ground Task Force.

We were in Bagram. We had six Harriers. They flew 50 hours a month per airplane. Flew only at night for the most part, dropped 90,000 pounds of ordinance.

They landed in pitch black and took off in pitch black with night vision goggles. Only could use 90 feet of runway in width, which is about the size of this room at the most, because the other part of the runway was torn up.

Why did we use the AV-8, exclusively, in a mile-high runway. Why?

We had one F-18 there, and they said, "Don't ever bring this back. It will throw up too much fire. You are going to fry the motors."

It is an old runway that is being broken up, gets bombed out, shelled out, rocketed out.

Therefore, only half that runway can be used, and at most, at any one time, since it is a mile high, you need 4,000 feet, 3,800 feet, to take off and land.

Every time a C-17 did land, it fouled the runway, 22 pounds of rocks, big rocks.

The A-10, great machine, cannot land there. I mean, cannot operate off there if it loses a motor because it does not have any margin not to run off the runway.

The point is: The flexibility of the AV-8, S/TOVL airplane, in that environment, where we may be for many, years, and in other places just like it, provides the response time, the generation rate, to U.S. Special Operations Command (SOCOM) and anybody else that used it.

And I think I am going to take 12 more airplanes over there in September and do this again for a year—for many years to come.

It is just basically the future on the way we are going to do business for the next four years, as the Secretary said.

Mr. WELDON. Now, I will give Dr. Sambur—I did not mean to cut you off. But you are seeing the pressure we are under.

Secretary SAMBUR. I understand that.

Mr. WELDON. We have two programs that are operational now in aircraft: the F/A-18E/F and the F/A-22. They have a natural advantage over the Joint Strike Fighter because they have constituent bases. And the services know that, and they can turn them on for that support.

If the financial pressure in tactical aviation continues to grow the way it is, something is going to give. And the most likely candidate, if you look at political pressure, would be something that does not exist yet, which is the point you made in your statement.

Secretary SAMBUR. Well, I just want to re-characterize this, because you have given us a choice of cut off my right arm or cut off our left arm.

I want to make sure that you understand that the F/A-22 and the Joint Strike Fighter are complementary. You know, there is not a difference in terms of, you know, we are developing one plane and the Joint Strike Fighter is for different requirement bases.

They are both complementary and they are both needed.

And we are committed in the Air Force to both planes. And I think Dr. Roche was only indicating that the S/TOVL is an area of concern for him.

It is a hypothetical question, very hypothetical. But I will tell you, our position within the Air Force is we need both planes—period.

Mr. WELDON. I appreciate you clarifying that.

And I would just say, we are not trying to box Dr. Roche in, but when he makes a statement like that before the appropriators, people in this city read into that all the time.

Secretary SAMBUR. I understand, I understand.

Mr. WELDON. And whether he meant that to be or not, that is being read into.

Secretary SAMBUR. And your comments about the financial doomsday occurring is certainly well understood and appreciated.

Mr. WELDON. Thank you both.

And I will now turn it over to my fill-in, who is going to act as chairman and do his questioning until I return.

Dr. GINGREY [presiding]. Thank you, Mr. Chairman—I think.

Dr. Sambur and General Keys, it is great to see you, and I thank you for taking some of your valuable time to be with us this morning.

I think it would be extremely helpful—and actually, Dr. Sambur, I think you have already commented, but if you do not mind, I will ask you to maybe repeat some of your previous statements.

I think it would be extremely helpful for you to briefly develop your summary of the F/A-22 program.

And I understand that the Defense Acquisition Board reviewed the F/A-22 program on 22 March and gave approval for the program to enter initial operational tests and evaluation on 30 April, pending the resolution of a few minor issues.

If you will, can you discuss DAB's recent action and what you think it means for the stability and the future of the program?

Secretary SAMBUR. Well, I think it means a significant amount for the stability of this program.

You know, we talked in the previous session about why some programs take so long. And we did a study to find out exactly what

was—one of the primary reasons for why programs get off track is because of instability in funding. And I think one of the things that is very necessary for this program is to maintain the funding stability.

We have done what we said last year—we re-baselined the program, we got ourselves back on track with respect to the development, we will not overrun that budget, we will achieve for Lot 4 22 aircraft, exactly as we predicted, we would achieve within the budget, we are on that target price curve.

So we are meeting our commitments.

And I think what the DAB said is that they were very encouraged. There are no impediment to going forward.

And I think there is a general belief right now that the program has turned the corner. And with Congress's ability to keep the funding stable, we will get the planes delivered for IOC in 2005, which will be a tremendous ability to keep air dominance and keep our country safe and secure.

Dr. GINGREY. General Keys, and again, I think Dr. Sambur had just touched on this in his earlier testimony. But it is my understanding that the F/A-22 recently participated in simulated combat missions against F-15s at Edwards Air Force Base, and I think it was an 8 to 4 advantage in numbers for the F-15s.

And, General, could you share those early results of these engagements and maybe briefly comment on the—it is been brought up many times, of course, in Mr. Li's testimony in regard to the problem with the avionic stability that certainly a year ago was, I think, a lot more serious than it is today. Maybe you could comment on that for us as well.

General KEYS. Sure, the bottom line is, they all died. And I would say that most of them died without ever firing a shot.

So as far as performance, the capability of the airplane, the pilots, have nothing bad to say about the airplane.

I have 4,000 hours flying fighters, for example, and I have never flown a fighter that at some point you did not get a bit light.

The question is: What is the implication of having that bit light. If the air-to-air interrogator light comes on in the middle of a run, the bottom line was they all died.

So, I think we have turned a corner on the software stability. Just for the instabilities that the pilot does not even see, we are well over the minimum. And for those critical instabilities that can be detected, we are up around 20 hours.

No one is going to fly this thing for 20 hours, so we believe we are on the right curve.

We have doubled the aircraft generation rate from October 2003. It is about .7 sorties per day on the airplane.

We have flown a number of days where we have taken four airplanes and turned them three times successfully. That says a lot about an airplane.

Because when we are turning them, we are turning with all the systems working because we are running test burn-down points.

So the reports that I have, talking personally with the pilots, they are extremely happy with the airplane. I think we are on the right road.

Dr. GINGREY. And, again, continuing in regard to that avionics problem, because, you know, that obviously is a pretty serious issue, or has been a very serious issue, and a great concern of this committee. And, of course, GAO pointed that out to us last year and again this year.

But it sounds as if there may be some discrepancy in what the previous panel said, Mr. Li and Mr. Sullivan, in regard to that requirement of five hours, meeting that Congressional requirement that was I guess in the 2004 defense authorization markup that we did here a year ago.

And it sounds like what you are saying is that not only has the Air Force—or the F/A-22 Raptor met that requirement, but it has actually far surpassed it. Is that not correct?

General KEYS. I think in fairness to them, I believe their report probably closed out as—you know, this is a moving target, as we are improving, and so at the point when they finish their report, we were not that far along.

Secretary SAMBUR. I think there is a little bit of confusion about the metrics.

There are two metrics: one that you indicated with respect to the Congressional metrics for the go ahead. As I indicated, there are two metrics and there is a little bit of confusion about what each of these metrics means.

The metric that Congress has held us to is a five-hour between critical failures. These are the type one, type two failures.

In testing right now, we are about 11.2 hours, significantly better than five.

The other number—which is mentioned I believe in the GAO report, which was about two, which is now six hours since then and has been validated by the DAB—is a measure of the effectiveness of doing the IOT&E.

It is not a metric that is a key performance parameter, but is really a metric that the test community imposed upon the F/A-22 in order to get through the IOT&E in an expedited fashion.

And we are now at 6.1 versus the five-hour metric. So on both of those metrics, the congressional one we are way above, and the one that the test community has imposed upon, we are well above.

And as I mentioned in my report, the test community within the Air Force deemed the effectiveness, which is all important, was deemed very impressive. I have never heard an AFOTEC commander come in and ever use anything better than it is okay.

Dr. GINGREY. Dr. Sambur, thank you. We are running out of time.

We have got I think just a few minutes left before our first vote, and I did want to recognize my colleague, the gentleman from Connecticut, Mr. Larson.

Mr. LARSON. Thank you.

I want to thank the gentleman from Georgia, and I will just associate myself with his remarks and seek written confirmation on the questions I would pose from the Members of the panel.

Let me acknowledge that I have enormous respect for GAO, and I think in many respects they help everybody sharpen their focus and pencils and perform an extraordinary job.

I did feel that with the more than 40 responses that DOD provided, that I wanted to hear your opinion, if you felt that their report reflected the detail in which you responded, number one.

Number two, proud to hear of the performance of the F/A-22. And also, specifically, there are Members on the Hill that believe that because of the enormous success that we have had in the field that we can just simply bolt on technology to F-15s and F-16s, which simply cannot work, and therefore the need for these programs, including the Joint Strike Fighter as well.

And would only ask that because of the questions raised by Mr. Weldon, and I associate myself with his remarks and ask for a response, jointly, from the armed services about the need and the commitment for that program.

And I thank you for your time.

Dr. GINGREY. I thank the gentleman.

I would just, in closing, like to thank all of the panelists: Admiral Nathman, Secretary Young, General Hough, Dr. Sambur, and General Keys.

And Mr. Li, Mr. Sullivan, thank you so much.

I think it was a great hearing. And I commend the chairman for holding this hearing.

And as we continue to look very closely at the kind of oversight that the GAO has given us in this program and others, and I associate myself with the remarks of the chairman. But I am a strong advocate and I think the testimony here today indicates that we need not just one of these planes but both of them.

And I thank you both for your testimony—all of you for your testimony.

Thank you very much.

Meeting is adjourned.

[Whereupon, at 11:10 a.m., the subcommittee was adjourned.]

A P P E N D I X

MARCH 25, 2004

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

MARCH 25, 2004

Statement of the Honorable Curt Weldon
Chairman, Subcommittee on Tactical Air and Land Forces

Tactical Aircraft and Supporting Programs

March 25, 2004

The Subcommittee will come to order.

This morning the Tactical Air and Land Forces Subcommittee meets to receive testimony on tactical aircraft and related programs in the Fiscal Year 2005 budget request.

We have two panels of witnesses: The first representing the General Accounting Office to provide the Subcommittee with their views on the status of the F/A-22 and Joint Strike Fighter programs and the second, representatives of the Departments of the Navy and Air Force to provide us an update on the F/A-22 and JSF and other major tactical aircraft and related programs.

I've maintained through the years, first as Chairman of the R&D Subcommittee, again as Chairman of the Military Procurement Subcommittee, and now today that the proposed defense budgets were insufficient to adequately fund the programs

included in the budget requests. This is particularly true for the tactical aircraft programs -- to include the Comanche helicopter program. Unfortunately, this is exactly what has and is happening. Comanche has been cancelled. The F/A-22 cost increases continue to result in a reduction in aircraft, with the total buy now projected at 218 aircraft. Last year the Navy reduced its projected buy of Joint Strike Fighters by over 400 aircraft -- and the first flight of the Navy JSF is well over 3 years away. Looking at the long-term and the overall DOD budget, CBO projects an approximate 30 percent shortfall in required funding to execute the long term defense plan. Given the overall national fiscal realities, this portends further program adjustments.

The F/A-22 program began in 1986 with a plan for 750 aircraft. With the subsequent reductions related to the end of the Cold War and much smaller defense budgets, the Air Force had a procurement objective in 1998 of 381 aircraft. Since that point in time, with continued program cost increases and with the congressionally imposed cap on the

production program, the Department of Defense and the GAO agree that the likely procure is approximately 218 aircraft. The good news is that progress has been made in the last year with the F/A-22, with apparent resolution of the vertical tail buffet problem and improved avionics software reliability.

Both the F/A-22 and Joint Strike Fighter are very complex systems and offer to provide our military services with superior capability. But both of these programs are costly to the American taxpayer and we must do everything we can to contain those costs. The F/A 22 R&D and procurement costs have increased well over 100 percent. The R&D estimated cost of the Joint Strike Fighter, is already up 80 percent. In just the last year alone, the JSF R&D program has gone up 22 percent.

I appreciate the technical challenges in these programs. But when we have senior DOD representatives testify before us as to the importance of accurate costing to the credibility and integrity of the acquisition system, tell us that all of the major programs have been re-baselined for cost, and then we continue to incur

double digit cost increases on an annual basis on many of our major programs, credibility does indeed suffer. If we are to make informed judgments on programs, we have to do a better job at estimating program costs.

Another area of concern is in the electronic combat mission area. DOD plans project going from one major platform, the EA-6, to at least four: the EA-18, the B-52, miniature air launched decoys, and a JSF derivative. The Joint Unmanned Combat Air System, formerly the Unmanned Combat Aerial Vehicle, is a fifth platform mentioned for the electronic combat role. Unfortunately, it now appears that this program has been orphaned by the Air Force and Navy and is a \$700 million program in the Defense Advanced Research Projects Agency. Without service funding, we may be missing an opportunity to address a variety of strike and electronic combat requirements with what would be a truly transformational capability.

We look forward to hearing from our panels about these programs.

On the first panel:

Representing the General Accounting Office is Mr. Allen Li, Director of Acquisition Sourcing Management for F-22, supported by Mr. Mike Sullivan, Director of Acquisition Sourcing Management for JSF.

Our second panel will be comprised of:

John Young, Assistant Secretary of the Navy, Research, Development and Acquisition, supported by Admiral John Nathman, Deputy Chief of Naval Operation, Warfare Requirements and Programs, and Lt General Michael Hough, Deputy Commandant for Aviation. From the Air Force we have Dr. Marvin R. Sambur, Assistant Secretary of the Air Force, supported by Lt General Ronald Keys, Deputy Chief of Staff for Air and Space Operations

Thank you to all of our witnesses for joining us. We look forward to your testimony.

Before we begin I would like to ask my good friend from Washington if he has any opening remarks he would like to make.

I would like to proceed with the first panel's testimony and then go to into questions for that panel and then take testimony from the second panel, which will then be followed by questions.

Without objection, all witnesses' prepared testimony will be

accepted for the record.

Mr. Li, please proceed with your opening remarks.

That concludes the testimony for our first panel. We ask that the GAO witnesses remain in case there are additional questions. Will the Navy and Air Force witnesses please be seated.

Secretary Young, please proceed with your opening remarks.

Thank you, Secretary Young, Secretary Sambur, please proceed with your opening remarks.

United States General Accounting Office

GAO

Testimony

Before the Subcommittee on Tactical Air
and Land Forces, Committee on Armed
Services, House of Representatives

For Release on Delivery
Expected at 9: a.m. EST
Thursday, March 25, 2004

TACTICAL AIRCRAFT

Status of the F/A-22 and Joint Strike Fighter Programs

Statement of Allen Li, Director, Acquisition and Sourcing
Management



G A O

Accountability * Integrity * Reliability

GAO-04-597T

March 25, 2004

GAO
Accountability Integrity Reliability

Highlights

Highlights of GAO-04-597T, a testimony before the Subcommittee on Tactical Air and Land Forces, Committee on Armed Services, House of Representatives

Why GAO Did This Study

The Department of Defense's (DOD) two major tactical aircraft fighter programs, the F/A-22 and the Joint Strike Fighter, represent an investment of about \$280 billion. Problems in the F/A-22 development program have led to a 10-year delay in delivering the initial capability and development cost increases of \$16 billion. The Joint Strike Fighter, which experienced problems early in the program, is now at a critical crossroad in development. Any discussion of DOD's sizeable investment that remains in these programs must also be viewed within the context of the fiscal imbalance facing the nation within the next 10 years.

GAO was asked to testify on the status of the F/A-22 and draw comparisons between both F/A-22 and Joint Strike Fighter programs' acquisition approaches.

What GAO Recommends

GAO is not making recommendations. In a recently issued report on the F/A-22 (GAO-04-391), GAO recommended that DOD complete a new business case for the F/A-22 to justify its need and the quantities necessary and affordable to carry out its mission. GAO also recommended that DOD provide plans and costs for resolving problems identified during initial operational testing to the defense committees before the DOD's full rate production decision. DOD partially concurred with both recommendations.

www.gao.gov/cgi-bin/gettrpt?GAO-04-597T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Allen Li at (202) 512-4841 or lia@gao.gov.

TACTICAL AIRCRAFT

Status of the F/A-22 and Joint Strike Fighter Programs

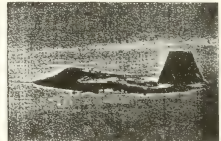
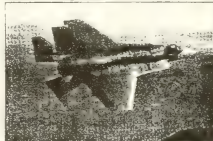
What GAO Found

The F/A-22 program has experienced several significant challenges since it began development in 1986. First, the Air Force had originally planned to buy 750 aircraft, but it now estimates it can only afford about 218 aircraft. Second, in order to develop an expanded air-to-ground attack capability, DOD estimates that the Air Force will need \$11.7 billion in modernization funding. Third, the Air Force has determined that new avionics computer processors and architecture are needed to support most planned enhancements, which will further increase program costs and risk. Lastly, the development test program continues to experience problems and risks further delays primarily due to avionics failures and problems meeting reliability requirements.

Because of the risks of future cost increases and schedule delays, a congressional subcommittee requested that DOD provide business case information on the F/A-22. However, the information DOD provided did not address how many aircraft the Air Force needs to accomplish its missions, how many the Air Force can afford considering the full life-cycle costs, whether investments in new air-to-ground capabilities are needed, and what are the opportunity costs associated with purchasing any proposed quantities of this aircraft.

The Joint Strike Fighter program started system development and demonstration in 2001 and has already encountered some cost and schedule problems. It is now working toward maturing the aircraft design and is considering delays in its critical design reviews to attain greater knowledge before making a decision to increase its investment significantly. In contrast, the F/A-22 program encountered poor cost and schedule outcomes because it had not gathered the appropriate knowledge at critical junctures in the program. The Joint Strike Fighter program is still early in its development program, with a greater opportunity to efficiently apply knowledge to its critical investment decisions.

Joint Strike Fighter and F/A-22 Aircraft



Source: JSF and F/A-22 System Program Offices

Mr. Chairman and Members of the Subcommittee:

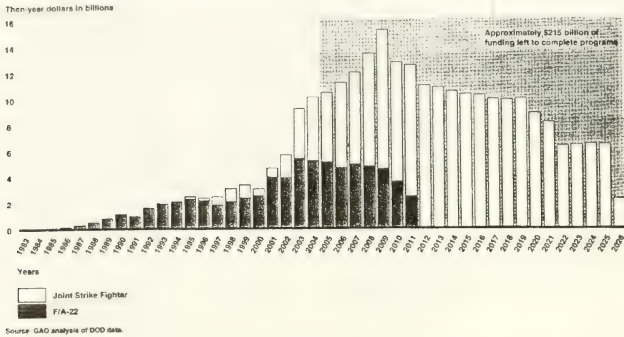
I am pleased to be here today to participate in the Subcommittee's hearing on the status of the Department of Defense's (DOD) major tactical aircraft fighter programs, the F/A-22 and the F-35, also known as the Joint Strike Fighter (JSF). Both programs are intended to replace aging tactical fighter aircraft with highly advanced, stealthy aircraft. The F/A-22 and JSF represent a substantial potential investment for DOD—about \$280 billion.

Any discussion of DOD's sizeable investment that remains in the F/A-22 and JSF programs must also be viewed within the context of the fiscal imbalance facing the nation within the next 10 years. There are important competing priorities, both within and external to DOD's budget, that require a sound and sustainable business case for DOD's acquisition programs based on clear priorities, comprehensive needs assessments, and a thorough analysis of available resources. Funding specific programs or activities will undoubtedly create shortfalls in others.

The federal government's future resource needs are staggering. For example, efforts to ensure homeland security has resulted in the creation of the Department of Homeland Security—the largest government reorganization in more than 50 years, involving 170,000 employees and a \$40 billion budget. Also, legislation was enacted to modernize the Medicare program to include a prescription drug benefit, at a potential cost of more than \$500 billion over the next 10 years alone. Given these and other important national priorities and relatively weak economic performance, historic budget deficits have returned and are projected to continue for the next decade. These important demands on our nation increasingly require policymakers to distinguish wants from needs and to judge what the nation can afford, both now and in the longer term.

These two fighter programs require substantial investments as shown in the figure 1. They must compete inside DOD with other important DOD major acquisition investments that will likely dominate future budget calls, including missile defense systems, the Army's Future Combat Systems, and larger investments in space programs to transform communication, intelligence, surveillance and reconnaissance capabilities.

Figure 1: Current F/A-22 and Joint Strike Fighter Assumptions for Development and Procurement



My statement today is primarily based on our recently issued report on the F/A-22.¹ Specifically, I will highlight significant changes in the development program, the readiness to begin initial operational testing and full rate production, and the sufficiency of DOD's current business case to justify the need for and the affordability of quantities necessary to carry out intended missions. Additionally, based on more limited work we have completed on the JSF, I will discuss the status of the JSF program, make some observations based on broad comparisons of its current acquisition approach to the acquisition experiences of the F/A-22 program, and identify additional challenges attendant with international cooperation. We performed the work associated with this statement in accordance with generally accepted government auditing standards.

¹ U.S. General Accounting Office, *Tactical Aircraft: Changing Conditions Drive Need for New F/A-22 Business Case*, GAO-04-391 (Washington, D.C.: Mar. 15, 2004).

In summary, because of the many changes that have occurred in the F/A-22 program and the remaining investment still to be made, we believe decision makers would benefit from a new business case that justifies the need for the full air-to-air and air-to-ground capabilities and the quantities needed that DOD can afford. Regarding the JSF, we understand that program managers are considering a delay in its critical design review to attain greater design stability in its airframe. In addition to seeking greater design stability, leadership in DOD could reap the benefits of its new acquisition policy that embraces the best practice concepts of knowledge-based, evolutionary acquisition by actively promoting and maintaining a disciplined approach to its acquisitions throughout the remaining critical decision points over the next few years.

Background

The Air Force began the F/A-22 development program in 1986 and expected to complete development in 9 years for an estimated cost of \$12.6 billion. Today, after being in development for almost two decades, the estimated development cost is \$28.7 billion, a 127 percent increase. The average unit procurement cost to buy the F/A-22 has also increased 122 percent. The result of these changes has been a loss of buying power that has reduced the initial buy quantity from 750 to 277 aircraft. Table 1 shows the changes in the development program from 1986 to 2002.

Table 1: Changes in F/A-22 Program Estimates Since It Started in 1986

	1986—Start of demonstration and validation	1991—Start of engineering and manufacturing development	2002—Current available Selected Acquisition Report Information
Development cost	\$12.6 billion	\$19.5 billion	\$28.7 billion
Development cycle time	9 years	16 years	19 years
Development test and evaluation	Not estimated	51 months	99 months
Initial operational capability	March 1996	Not shown in report	December 2005
Quantities	750	648	276*

Sources: Selected Acquisition Reports and Air Force documents.

Note: All references to F/A-22 costs in this report are in then-year dollars in order to maintain consistent reporting with our prior reports on the F/A-22 aircraft.

*In fiscal year 2003, the Air Force increased the number of F/A-22 aircraft it planned to buy from 276 to 277.

We have reported in the past that the F/A-22 acquisition approach was a major contributor to the cost increases and delays in schedule that led to reduced buying power. In testimony last year,² we identified lessons to be learned in the F/A-22 program, which did not follow a knowledge-based acquisition approach used by successful commercial firms. Leading commercial firms that we studied employ an acquisition approach that evolves a product to its ultimate capabilities on the basis of mature technologies and available resources. These firms then ensure that high levels of knowledge exist at three critical junctures in a development program. First, a match must be made between a customer's needs and the available resources—technology, engineering knowledge, time, and funding—before a new development program is launched. Second, a product's design must demonstrate its ability to meet performance requirements and be stable about midway through development. Third, the developer must show that the product can be manufactured within cost, schedule, and quality targets and is demonstrated to be reliable before production begins. DOD issued new acquisition policy in May 2003 that governs the development of major acquisition systems. This new policy embraces the best practice concepts of knowledge-based, evolutionary acquisition and represents a good first step toward achieving better outcomes from major acquisition programs.

The initial F-22 acquisition strategy did not employ an evolutionary approach. Instead, it sought to develop revolutionary capabilities from the outset of the program taking on significant risk and onerous technology challenges. Three critical technologies were immature at the start of the program—low-observable materials, propulsion, and integrated avionics. Integrated avionics has been a source of major schedule delays and cost increases in the F/A-22 program. Starting the program with these immature technologies prevented the program from knowing cost, schedule, and performance ramifications until late in the development program, after significant investments had already been made. Efforts to mature technology cascaded into development, delaying attainment of design and production maturity.

² U.S. General Accounting Office, *Best Practices: Better Acquisition Outcomes Are Possible If DOD Can Apply Lessons from F/A-22 Program*, GAO-03-645T (Washington, D.C.: Apr. 11, 2003). We testified on the failure to use best practice acquisition concepts and used the F/A-22 program as a case study to show lessons to be learned had the F/A-22 applied this best practice approach in its development and procurement activities.

The JSF, which started in 1996, is not as far along in its development, but is experiencing problems that could similarly threaten DOD's investment. It is at a critical crossroad, one that, based on our prior work, was approached and passed by several other DOD programs without capturing the appropriate knowledge for the sizable investment decisions being made. While the JSF program started with higher risks by failing to mature its technologies, it is considering a delay to its investment decision that determines the need to invest in tooling, labor, and facilities to manufacture aircraft until the airframe design has become more stable.

Significant Changes Require Additional Investments to Expand F/A-22 Capability

The basic mission of the F/A-22, initially focused on air-to-air dominance, has changed to include a significantly greater emphasis on attacking ground targets. To accomplish this expanded mission, the Air Force will need additional investments to develop and expand air-to-ground attack capabilities for the F/A-22. Moreover, the efforts to expand its capability will also add risks to an already challenged program. To accommodate planned changes will also require a new computer architecture and processor to replace the current less capable ones.

The expanded air-to-ground attack capability will allow the F/A-22 to engage a greater variety of ground targets, such as surface-to-air missile systems, that have posed a significant threat to U.S. aircraft in recent years. This was not previously considered a primary role for the aircraft as it was intended to be primarily an air-to-air fighter to replace the F-15. From the outset the F/A-22 was built to counter expected large numbers of new advanced Soviet fighter aircraft, but this expected threat never materialized.

The Air Force has a modernization program to improve the capabilities of the F/A-22 focused largely on a more robust air-to-ground capability. It intends to do so using five developmental spirals planned over more than a 10-year period, with the initial spiral started in 2003. In March 2003, the Office of Secretary of Defense's Cost Analysis Improvement Group (CAIG)³ estimated that the Air Force would need \$11.7 billion for the planned modernization program. The CAIG estimate included costs for development, production, and the retrofit of some aircraft. As of March 2003, the Air Force F/A-22 approved program baseline did not include

³ The Office of Secretary of Defense CAIG acts as the principal advisory body to the milestone decision authority on cost.

estimated costs for the full modernization effort. Instead, the Air Force estimate included \$3.5 billion for modernization efforts planned through fiscal year 2009. Table 2 shows each spiral as currently planned.

Table 2: Planned Modernization Enhancements for the F/A-22 Program

Fiscal year expected to incorporate enhancements	2007	2011	2013	2015
Developmental spiral	Global Strike Basic	Global Strike Enhanced*	Global Strike Full	Enhanced intelligence, surveillance, and reconnaissance
Examples of enhancements to be added	Capability to launch Joint Direct Attack Munition at faster F/A-22 air speeds and at longer distances and update to air-to-air capabilities.	Improved radar capabilities to seek and destroy advanced surface-to-air missile systems and integrate additional air-to-ground weapons.	Increased capability to suppress or destroy the full range of air defenses and improve speed and accuracy of targeting.	Capability for full intelligence, surveillance, and reconnaissance integration for increased target sets and lethality.
Cost Analysis Improvement Group's estimate through fiscal year 2015				\$11.7 billion

Sources: Air Force and Office of Secretary of Defense

*The Global Strike Enhanced includes two developmental spirals to achieve the planned enhanced capability.

To complete the planned enhancements, the F/A-22 will also need a new computer architecture and avionics processors. Current architecture and processors will be upgraded to support enhancement through the Global Strike Enhanced development spiral. However, because the current architecture and processors are old and obsolete and do not have sufficient capacity to meet the increased processing demands required for planned new air-to-ground capabilities beyond the Global Strike Enhanced spiral, they must be replaced.

Rather than start a new development program, the F/A-22 program office plans to leverage two other ongoing Air Force development or modification programs for this new processing capability: the new architecture being developed for the JSF and the new commercial off-the-shelf general-purpose processors designed for newer versions of the F-16. According to F/A-22 program officials, they do not expect the new architecture to be fully developed and ready for installation in the F/A-22 for at least 5 to 6 years.

Additional risks are likely because the new processor and architecture are being developed by other major aircraft programs and will require extensive integration and operational testing to ensure that the F/A-22 program does not encounter similar problems that have delayed integration and testing of the F/A-22's current avionics suite. F/A-22 program officials acknowledge that this mass changeover of the F/A-22 computer architecture and avionics processor will be a time-consuming and costly effort and will likely create additional program risks. Air Force cost estimates are not yet available, but program officials estimate the nonrecurring engineering costs alone could be at least \$300 million. At the time of our review, the Air Force had not made a decision about retrofitting aircraft equipped with the old microprocessor.

Further Delays in Initial Operational Testing Could Impact Planned Full Rate Production Decision

The Air Force schedule includes plans to make the full rate production decision in December 2004, but initial operational test and evaluation (IOT&E) has not started. The Air Force's efforts to stabilize avionics software and improve its performance have not been sufficiently demonstrated to start IOT&E, and the planned entrance criterion was changed. In addition, the F/A-22 program is not performing as expected in some other key performance areas like system reliability. These problems have contributed to the need for a new test schedule and an additional 7-month delay in the start IOT&E. Together these problems increase the potential for additional development costs and delays in the full rate production decision. Since our report in March 2003, the Air Force has corrected some key design problems identified at that time, but others remain.

Avionics Do Not Meet Criterion to Start Operational Testing

The stability and performance of F/A-22 avionics has been a major problem causing delays in the completion of developmental testing and the start of IOT&E. Because the F/A-22 avionics encountered frequent shutdowns over the last few years, many test flights were delayed. As a result, the Air Force Operational Test and Evaluation Center wanted assurances that the avionics would work before it was willing to start the IOT&E program. It established a requirement for a 20-hour performance metric that was to be demonstrated before IOT&E would begin. This metric was subsequently changed to a 5-hour metric that included

additional types of failures, and it became the Defense Acquisition Board's⁴ criterion to start IOT&E. In turn, Congress included the new metric, known as Mean Time Between Avionics Anomaly or MTBAA, in the National Defense Authorization Act for Fiscal Year 2004.⁵ As of January 2004, the Air Force had not been able to demonstrate that the avionics could meet either of these criteria.

Testing as of January 2004 showed the program had achieved 2.7 hours—54 percent of the 5-hour stability requirement to begin IOT&E. While the Air Force has not been able to meet the new criteria, major failures, resulting in a complete shutdown of the avionics system, have significantly diminished. These failures are occurring only about once every 25 hours on average. This is the result of a substantial effort on the part of the Air Force and the contractor to identify and fix problems that led to the instability in the F/A-22 avionics software. However, less serious failures are still occurring frequently.

Reliability Requirements Not Being Met

The F/A-22 program is not meeting its requirements for a reliable aircraft, and it is not using a knowledge-based approach. The Air Force established reliability requirements to be achieved at the completion of development and at system maturity.⁶ As a measure of the system's overall reliability, the Air Force established a requirement for 1.95-hours mean time between maintenance by the completion of development and 3-hours mean time between maintenance at system maturity. This measure of reliability represents the average flight time between maintenance actions. As of October 2003, the Air Force had only been able to demonstrate a reliability of about 0.5 flying hours between maintenance actions or about 26 percent of the development requirement and 17 percent of system maturity requirement. This has led to test aircraft spending more time than planned on the ground undergoing maintenance.

In addition to the high level of maintenance required, failures in F/A-22 parts and components also caused reliability problems. During 2003, the

⁴ The Defense Acquisition Board is DOD's senior-level forum for advising the Under Secretary of Defense Acquisition, Technology, and Logistics on critical decisions concerning major defense acquisition programs.

⁵ Pub. L. 108-136 (Nov. 24, 2003), section 133.

⁶ System maturity is defined by the Air Force as a point when the F/A-22s have accumulated 100,000 flying hours, expected to occur in 2008 after most F/A-22s are to be procured.

Air Force identified 68 parts that had a high rate of failure causing them to be removed or replaced and affecting the F/A-22 system reliability. The contractor has initiated programs to eliminate the high failure rates experienced by these parts. The canopy has also been experiencing failures during testing, allowing it to achieve only about 15 percent of its expected 1,600-hour life. The Air Force is considering using a second manufacturer for canopies, but until it has passed qualification testing, it cannot be used as an alternative source for the high-failing canopies.

The F/A-22 program began limited production before demonstrating reliability. Our work has shown that product development engineers from leading commercial firms expect to achieve reliability requirements before entering production. They told us reliability is attained through an iterative process of design, testing, analysis, and redesign.⁷ Commercial firms understand that once a system enters production, the costs to achieve reliability through this iterative design change process become significantly more expensive. The F/A-22 aircraft has been in production since fiscal year 1999, and the Air Force has on contract 52 production aircraft, and an additional 22 aircraft on long lead contracts representing 27 percent of the planned buy quantity. With 83 percent of the reliability requirement yet to be achieved through this iterative design change process, the Air Force can expect to incur additional development and design change costs. If the Air Force fails to improve the F/A-22's reliability before fielding the aircraft, the high failure rates will result in higher operational and support costs to keep the aircraft available for training or combat use.

Operational Testing Delayed and Divided into Two Phases

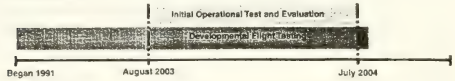
Avionics and reliability problems were the major contributors to delays in F/A-22 flight-testing in 2003. As a result, the start of IOT&E was delayed an additional 7 months. Realizing the Air Force would not be ready to enter initial operational testing as previously planned, the Office of the Secretary of Defense requested the F/A-22 program to establish a new operational test plan that includes measures to ensure the aircraft and its avionics are ready before entering operational testing. In response, the Air Force put in place a two-phase operational test program.

⁷ U.S. General Accounting Office, *Best Practices: Capturing Design and Manufacturing Knowledge Early Improves Acquisition Outcomes*, GAO-02-701 (Washington, D.C.: July 15, 2002).

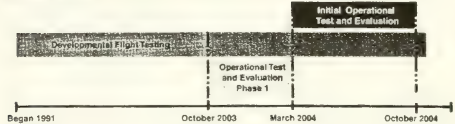
- Phase 1, also called an operational assessment, is not the official start of operational testing. It is intended to assess the F/A-22's readiness for IOT&E. Started in October 2003, it calls for testing two F/A-22 aircraft.
- Phase 2 testing is considered the actual start of IOT&E. To begin this phase, the Air Force must meet a number of criteria. Perhaps most importantly, it must demonstrate that the F/A-22's integrated avionics will be able to operate for sufficient lengths of time, without shutting down. Figure 2 compares the changes in the planned test program since our March 2003 report.⁸

Figure 2: F/A-22 Flight Test Schedule Changes

2003 Schedule



Revised Schedule



Source: Air Force

According to Air Force test officials, results of some phase 1 tests could be used to satisfy IOT&E requirements if the aircraft and software configurations do not change for IOT&E testing. This could reduce the scope of the test effort planned during IOT&E. The Defense Acquisition Board is scheduled to review the F/A-22's readiness for IOT&E later this month.

⁸ U.S. General Accounting Office. *Tactical Aircraft: DOD Should Reconsider Decision to Increase F/A-22 Production Rates While Development Risks Continue*, GAO-03-431 (Washington, D.C.: Mar. 14, 2003).

At the present time, the Air Force expects to complete IOT&E in October 2004, before the full rate production decision, now expected in December 2004. The time allotted to complete IOT&E under the new test plan, however, has been compressed by 4 months, assuming phase 1 testing results are not permitted to be used for IOT&E. This means the Air Force would have less time than previously planned to complete the same amount of testing. If the Air Force continues to experience delays in testing prior to IOT&E, then the full rate production decision would also have to be delayed until IOT&E is complete and the Beyond Low Rate Initial Production Report is delivered to Congress.⁹

Past Design Problems Corrected

The Air Force has corrected design problems discussed in our March 2003 report. To correct the movement or buffeting of the vertical fins in the tail section of the aircraft, the Air Force designed and implemented modifications, which strengthen the fin and hinge assemblies. Because of this problem, the Air Force placed restrictions on flights below 10,000 feet. Testing was done above and below 10,000 feet, and the flight restrictions were removed. Likewise, the Air Force modified the aircraft to prevent overheating concerns in the rear portion of the aircraft by adding thermal protection and strengthened strategic areas in the aft tail sections. The Air Force also plans to modify later production aircraft using a new venting approach to resolve the heat problems. We reported that the Air Force had also experienced separations in the horizontal tail materials. After additional testing, the Air Force deemed that the original tails met requirements established for the life of the airframe. However, the Air Force redesigned the tail to reduce producibility costs. Tests will be performed on the redesigned tail in late 2004.

⁹ 10 U.S.C. 2399 provides that a major defense acquisition program may not proceed beyond low-rate initial production until initial operational test and evaluation is completed and the defense committees have received the report of testing results from the Director of Operational Test and Evaluation.

Business Case Information Did Not Justify Current Aircraft Quantities or Modernization Investment Plans

The business case made to justify the F/A-22 program at its outset is no longer valid. Since that time, program cost and schedule have grown substantially and affordable quantities have been reduced by 60 percent. The expected threat, for which this aircraft was originally designed, never materialized, and new, more demanding ground threats, like surface-to-air missile systems, have evolved, requiring expanded capabilities that will require significant new developmental investments. In addition, technical problems have not been resolved, and uncertainty about the outcome of operational testing could lead to additional development costs and further delays.

Today, the Air Force estimates the total F/A-22 acquisition program will cost about \$72 billion, excluding about \$8 billion estimated by the CAIG to complete modernization activities. Including these costs brings the estimated total investment for the F/A-22 program to about \$80 billion. Through fiscal year 2004, about one-half of this investment has been funded, leaving key investment decisions in the near future on the remaining \$40 billion for aircraft production and upgrades in capability.

Last year, in light of the changes in the program and investments that remained, the Subcommittee on National Security, Emerging Threats, and International Relations of the House Committee on Government Reform asked DOD to provide a new business case justifying the Air Force's planned number of F/A-22s (276 at that time) as well as how many F/A-22s are affordable. In its response, DOD did not sufficiently address key business case questions such as how many F/A-22s are needed, how many are affordable, and if alternatives to planned investments increasing the F/A-22 air-to-ground capabilities exist.

Instead, DOD stated it planned to buy 277 F/A-22s based on a "buy to budget" concept that determines quantities on the availability and efficient use of funds by the F/A-22 program office. Furthermore, justification for expanding the capability to a more robust air-to-ground attack capability was not addressed in DOD's response. While ground targets such as surface-to-air missile systems are acknowledged to be a significant threat today, the response did not establish a justification for this investment or state what alternatives were considered. For example, the JSF aircraft is also expected to have an air-to-ground role, as are planned future unmanned combat air vehicles. These could be viable alternatives to this additional investment in F/A-22 capability.

While the business case information submitted to the subcommittee called for 277 aircraft, DOD stated it could only afford to acquire between 216

and 218 aircraft within the congressionally imposed cap on production costs—currently at \$36.8 billion. DOD expects improvements in manufacturing efficiencies and other areas will provide it with sufficient funds to buy additional F/A-22 aircraft. However, this seems to be an unlikely scenario given the program's history. Previously, DOD, under its "buy to budget" approach, used \$876 million mostly from production funds to cover increases in development costs, thus reducing aircraft quantities by 49. With testing still incomplete and many important performance areas not yet demonstrated, the possibility for additional increases in development costs is likely.

The analysis and conclusions in our recent report led us to recommend that DOD complete a new business case that justifies the need for the F/A-22 and that determines the quantities needed and affordable to carry out its air-to-air and air-to-ground mission. In preparing the business case, we also recommended DOD look at alternatives to the F/A-22 for dealing with the ground threats that were driving the need for an expanded air-to-ground capability. In response to a draft of that report, DOD partially concurred, stating that it evaluates the F/A-22 business case elements as part of the annual budget process. Additionally, DOD's response acknowledged that this year the department is undertaking a broader set of reviews under the Joint Capabilities Review process and that the F/A-22 will be a part of that review. In our report, as part of the evaluation of DOD's comments, we noted that an independent and in-depth study of the F/A-22 program has been requested by the Office of Management and Budget and that such a study provided an opportunity for completing a business case analysis.

JSF Joint Strike Fighter Program Is Approaching a Decision Point

The JSF acquisition program is approaching a key investment decision point in its development as it prepares to stabilize the design for its critical design reviews. The program has many demands and requirements to satisfy before it is completed. It is the most expensive acquisition program in DOD's history with plans to buy almost 2,500 aircraft for an estimated acquisition cost of about \$200 billion. The design plans are for three variants for the Air Force, Navy, and Marine Corps, with development partners and potential customers that span the globe. Upcoming investment decisions will be a prominent indicator of the risk program management and senior leadership will assume for this program. The program's size—in terms of funding, number of aircraft, and program participants—will create challenges for decision makers over the next several years. They will face decisions that need to be guided by a sound business case and an evolutionary, knowledge-based acquisition process

that will provide more predictable cost, schedule, and performance outcomes.

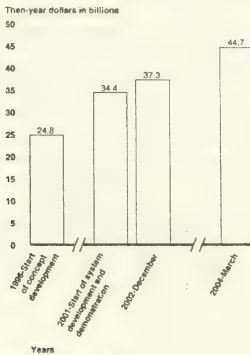
The JSF is a joint, multi-national acquisition program for the Air Force, Navy, Marine Corps, and eight cooperative international partners.¹⁰ The program's objective is to develop and deploy an affordable weapon system that satisfies a variety of war fighters with different needs. The system is intended to consist of a family of highly common and affordable strike aircraft designed to meet an advanced threat and a logistics system to enable the JSF to be self-sufficient or part of a multisystem and multiservice operation. This family of strike aircraft will consist of three variants: conventional takeoff and landing, aircraft carrier suitable, and short take off and vertical landing. The JSF program began in November 1996. After a five-year competitive concept demonstration phase between Boeing and Lockheed-Martin, DOD awarded Lockheed-Martin a contract in October 2001 to begin system development and demonstration.

Current Status of the Joint Strike Fighter Program's Cost, Schedule, and Funding

We are aware that program managers are contemplating changes to the program that could delay the schedule and increase costs, but confirmation and details are not yet available. Nonetheless, current program office estimates do provide some insights. Since the JSF acquisition program began in 1996, the cost of development has grown by about 80 percent. As shown in figure 3, the majority of this cost growth, from an estimated \$24.8 to \$34.4 billion, was recognized at the time the program transitioned from concept development to system development and demonstration in 2001. The program office cited schedule delays, implementation of a new block development approach that extended the program by 36 months, and a more mature cost estimate as the major causes for the increase. Since the start of system development and demonstration, the estimate has increased by an additional \$10.3 billion because of continued efforts to achieve international commonality, optimize engine interchangeability, further refinements to the estimating methodology, and schedule delays for additional design work.

¹⁰ International partners include the United Kingdom, Italy, the Netherlands, Turkey, Canada, Australia, Denmark, and Norway.

Figure 3: Joint Strike Fighter Cost of Development from Fiscal Year 1996 to 2004



Source: GAO analysis of DOD data.

In both 2000 and 2001, when the program was making the critical decision to move into system development and demonstration, we reported and testified that technologies had not been sufficiently demonstrated to reduce risk to a level commensurate with a decision to commit major capital and time to product development.¹¹ While some of these technologies continue to be troublesome, in March 2003, the program's

¹¹ U.S. General Accounting Office, *Joint Strike Fighter Acquisition: Development Schedule Should Be Changed to Reduce Risks* (GAO/T-NSIAD-00-132, Mar. 16, 2000); *Joint Strike Fighter Acquisition: Development Schedule Should Be Changed to Reduce Risks* (GAO/NSIAD-00-74, May 9, 2000); *Defense Acquisitions: Decisions on the Joint Strike Fighter Will Be Critical For Acquisition Reform* (GAO/T-NSIAD-00-173, May 10, 2000); *Joint Strike Fighter Acquisition: Mature Critical Technologies Needed to Reduce Risks* (GAO-02-39, Oct. 19, 2001).

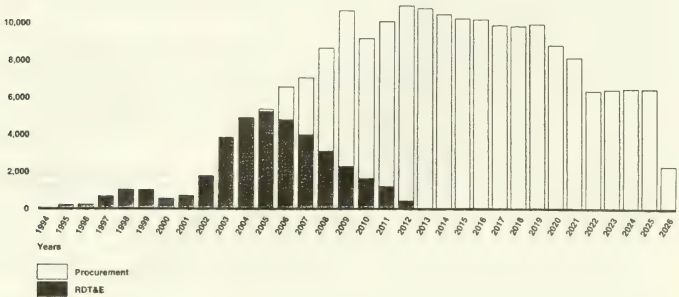
preliminary design review revealed significant issues related to aircraft design maturity.

Weight has become the most significant design risk for the program as it approaches its critical design review. The increased weight of each variant design could degrade aircraft range and maneuverability if not brought under control. According to the program office, the airframe design has matured more slowly than anticipated and software development and integration is posing a significant design challenge. Also, in a 2003 annual report, the Director of Operational Test & Evaluation stated that weight growth is a significant design risk for all the variants, that the development schedule is aggressive, and that efforts to reduce weight have eroded a large part of the schedule.

We also note that the program's funding profile assumes almost \$90 billion of funding over the next 10 years, an average of almost \$9 billion a year. This will require the JSF program to compete with many other large programs for scarce funding during this same time frame. Sustaining this level of high funding for such a long period will be a challenge. The JSF program's latest planned funding profile for development and procurement—as of December 2002—is shown in figure 4.

Figure 4: Current Joint Strike Fighter Funding Assumption for Development and Procurement

Then-year dollars in millions
12,000



Source: GAO analysis of DOD data.

Knowledge-Based Decisions Are Needed for the Road Ahead

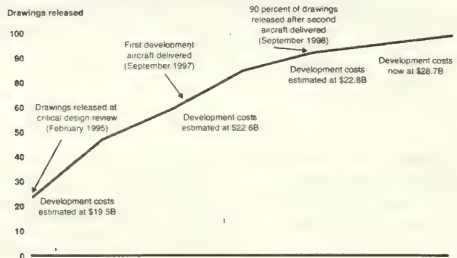
The JSF program faces critical decisions over the next 24 months. Decisions made today will greatly influence the efficiency of the rest of its funding—almost 90 percent of the total. As a result of current concerns over system integration risk, the program office is currently restructuring the development program, which will add significant cost and delay the development schedule. For example, it is considering delaying its critical design reviews, its first flights of development aircraft, and its limited rate production decision to allow more time to mitigate design risk and gather more knowledge before moving forward with continued major investments.

While no one wants to delay critical reviews, now is the time to get the design right rather than later. Going forward with an incomplete review may cause more problems later in the effort. Indeed, based on our past best practices work and lessons learned from the F/A-22 development effort, we have seen many examples where programs moved forward past

their critical design review without gathering the knowledge needed to verify that their design was stable. This has led to poor cost and delivery outcomes for these programs. We have also seen the reverse, where programs have gathered appropriate knowledge before their critical design review. These programs had much more predictable cost and schedule outcomes.

The F/A-22 program held its critical design review in 1995 with only about 26 percent of its design drawings complete. Best practice criteria calls for 90 percent of drawings to be complete before a design can be considered stable enough to commit to additional significant investments of time, labor, material, and capital. Figure 5 shows the engineering drawing completion history of the F/A-22 along with changes to development cost estimates as the program progressed.

Figure 5: F/A-22 Engineering Design Drawing History and Development Costs



Source: GAO analysis of DOD data

An incomplete F/A-22 critical design review contributed to several design and manufacturing problems that resulted in design changes, labor inefficiencies, cost increases, and schedule delays. Since the time of its critical design review, the F/A-22's development costs have increased by about 50 percent. The JSF program has the opportunity to avoid a similar situation. We believe that, given the apparent design challenges at this point in the program, a delay to gather more knowledge before increasing

the investment is warranted and may help to reduce turbulence later in development, before the program begins "bending metal" for development aircraft. The JSF program is at a pivotal point, one in which the effort will turn from a paper design to actually manufacturing a product, something that requires considerably more money. While we believe the program moved forward with too much technology risk up to this point, it has an opportunity now to achieve critical design knowledge by taking the time to develop a mature design before moving into manufacturing. The program can use lessons learned from the F/A-22 acquisition right now to keep on track and deliver an affordable, high quality weapon system sooner rather than later.

Additional Challenges Attendant with International Cooperation

The JSF program is based on a complex set of relationships among all three services and governments and industries from eight foreign partners. The program is expected to benefit the United States by reducing its share of development costs, increasing future aircraft sales, giving it access to foreign industrial capabilities, and improving interoperability among the services and allies. For their part, partner governments expect to benefit from relationships with U.S. aerospace companies, access to JSF program data, and influence over aircraft requirements. They will also benefit financially by obtaining waivers of nonrecurring aircraft costs on an aircraft they could otherwise not afford to develop on their own. The partners expect a return on their investment through JSF contract awards for their industries that will improve their defense industrial capability, a critical condition for their participation. They have agreed to contribute about \$4.5 billion to the JSF development program and are expected to purchase several hundred aircraft once it enters production.

With these mutual benefits come challenges. Support for the program from our international partners hinges in large part on expectations for financial returns, technology transfer, and information sharing. If these expectations are not met, that support could deteriorate. In addition, a large number of export authorizations are needed to share information and execute contracts. These authorizations must be done in a timely manner to maintain schedule and ensure competition. Finally, transfer of sensitive U.S. military technologies needed to achieve commonality and interoperability goals will push the boundaries of U.S. disclosure policies.¹⁵

¹⁵ *Joint Strike Fighter Acquisition: Cooperative Program Needs Greater Oversight to Ensure Goals Are Met*, GAO-03-775 (Washington, D.C.: July 21, 2003)

Conclusions

DOD is not immune to efforts to address the fiscal imbalance confronting the nation and will continue to face challenges based on competing priorities, both within and external to its budget. This will require decisions based on a sound and sustainable business case for DOD's acquisition programs based on clear priorities, comprehensive needs assessments, and a thorough analysis of available resources. In addition, it will require an acquisition process that provides for knowledge-based decisions at critical investment junctures in order to maximize available dollars. DOD has instituted a new acquisition policy that embraces evolutionary and knowledge-based acquisition concepts. However, policy alone will not solve the problems DOD faces. This will also require disciplined actions on the part of DOD's leadership to employ the concepts established in its new policy.

While it is too late for the F/A-22 to go back and follow these concepts, there still is time to evaluate the need for additional aircraft; over fifty F/A-22's are presently on contract. Because of the nation's fiscal challenges, tough choices will need to be made regarding future spending priorities, including the remaining potential \$40 billion investment in the F/A-22. In light of this substantial investment and the many changes that have occurred in the F/A-22 program, we believe decision makers would benefit from a new business case that justifies the need for the full air-to-air and air-to-ground capabilities and the quantities needed and affordable.

The JSF program has a greater opportunity to make critical investment decisions using a knowledge-based approach. While the program started off with a high-risk approach by not maturing technologies before starting system development, it has the opportunity to manage the system development phase and stabilize the design before committing to large investments in manufacturing capability—tooling, labor, and facilities—to build test aircraft. The JSF program is considering a delay in its critical design review to attain greater design stability in its airframe. In addition to seeking greater design stability, leadership in DOD can reap the benefits of its new acquisition policy by actively promoting and maintaining a disciplined approach throughout the remaining critical decision points over the next few years. With these activities in place, DOD will be in a better position to request continued JSF funding and support.

Mr. Chairman, this concludes my prepared statement. I would be happy to respond to any questions that you or other members of the Subcommittee may have. If you have future questions about our work on the F/A-22 or JSF, please call Allen Li at (202) 512-4841.

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STATEMENT OF

**THE HONORABLE MICHAEL W. WYNNE
ACTING UNDER SECRETARY OF DEFENSE
(ACQUISITION, TECHNOLOGY, AND LOGISTICS)**

**BEFORE THE UNITED STATES HOUSE
COMMITTEE ON ARMED SERVICES
SUBCOMMITTEE ON TACTICAL AIR AND LAND FORCES**

March 25, 2004

**FOR OFFICIAL USE ONLY
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HOUSE COMMITTEE
ON ARMED SERVICES**

**The Honorable Michael W. Wynne
Acting Under Secretary of Defense
(Acquisition, Technology and Logistics)**

Mr. Chairman, Mr. Ranking Member, and Members of the Committee, I appreciate the opportunity to submit my testimony for the record. I am pleased to provide you with the Department's views on Tactical Aircraft Programs. Air supremacy is critical to America's military dominance and is one of the pillars of transformation. The Department's Tactical Air Programs and their associated capabilities are well-structured to maintain this supremacy against forecasted threats in an affordable manner.

Affordability of JSF, F/A-22 and F/A/E-18E/F/G Programs

The world-wide counter-air and air defense threat to U.S. aircraft is projected to increase over the next 20 years. Integrated air defenses pose risk to U.S. air forces, and some strike tasks continue to face significant challenges.

In response, the Department continues to pursue a three-phase tactical aircraft modernization program consisting of the F/A-18E/F, the F/A-22 and the Joint Strike Fighter (JSF). The Department believes that each of these programs is affordable so long as the programs are properly phased and scoped. Examples of how we maintain affordability include leveraging the multi-year procurement of F/A-18E/F for the EA-18G, by executing the F/A-22 buy-to-budget-strategy, and by implementing the Navy and Marine Corps Tactical Aviation Integration Plan. These have helped to shape a more capable and affordable force. The FY2005 President's Budget supports

this strategy for development and procurement of tactical aircraft weapon systems as an essential element of our future defense strategy and force structure.

The President's Budget provides \$2.98B to fund procurement of a total of 42 aircraft per year of F/A-18E/F and EA-18G aircraft under a multi-year contract. The multi-year procurement strategy spans five years, generating \$1.1 B in cost savings relative to a traditional annual procurement strategy. The F/A-18E/F replaces the F/A-18A/B/C/D models and the F-14 which are difficult to maintain and costly to operate. F/A-18E/F proved its worth in OPERATION IRAQI FREEDOM. It is in full rate production and the contractor is delivering aircraft within cost and ahead of schedule. The Navy's F/A-18E/F's heavier weapons loads and high sortie generation rates will complement the JSF's ability to operate in a higher threat environment when it enters the inventory.

The FY05 President's Budget request includes \$359M for EA-18G system development. The EA-18G replaces the Navy's aging EA-6B Airborne Electronic Attack (AEA) aircraft, providing full spectrum electronic attack services, including standoff and escort jamming. The EA-18G design uses a highly-common derivative of the two-seat F/A-18F, and will benefit from its positive track record. The EA-18G also leverages the EA-6B's proven Improved Capability III AEA avionics suite. These two proven systems, in combination, allow the Navy to modernize this mission area with an affordable replacement. The aircraft's flexible design and commonality with the F/A-18F provides the warfighter with an asset capable of performing multiple

missions, including standoff jamming, escort jamming, time-critical strike, full spectrum surveillance, or strike.

The President's Budget also provides \$4.1B to fund the procurement of up to 24 F/A-22 aircraft. The Department's buy-to-budget-strategy will control cost, while allowing the Air Force to procure high performance aircraft for its Global Strike concept of operations. The F/A-22, which replaces the older F-15C aircraft, provides supercruise, advanced all-aspect stealth, and information integration capabilities so that it can efficiently perform the missions of air dominance, destruction of enemy air defenses, and precision strike to assure U.S. air dominance for the foreseeable future. In addition to air-to-air capability, the F/A-22 program plans to have the capability to strike critical targets on the ground using the Joint Direct Attack Munition and, in the future, the Small Diameter Bomb.

The U.S. General Accounting Office (GAO) issued a report on the F/A-22 last week in which they made two recommendations; I partially concurred with both of them. In the first, the GAO recommended completion of a new analysis that determines the continued need for the F/A-22 before I make the Full Rate Production decision. I routinely evaluate F/A-22 program progress. In fact, just this Monday I chaired the Defense Acquisition Board (DAB) review of the program. This is the fourth time the DAB has reviewed the F/A-22 in the past year. I am pleased to report that the program is making significant progress and I expect it to enter Initial Operational Test & Evaluation (IOT&E) soon. In particular, avionics stability and performance has improved significantly from one year ago. In-addition to reviews by

the DAB, the Department's budget processes are designed to evaluate the continuing need for our major acquisition programs, including the quantities needed. This year, we will also be undertaking a broader review of the F/A-22 using Secretary Rumsfeld's Joint Capabilities Review process. I expect to have the results before the F/A-22 comes to me for the Full Rate Production decision.

The GAO's second recommendation on the F/A-22 was for the Secretary of Defense to provide Congress the IOT&E results and the plan, including funding, to correct any deficiencies. The Director, Operational Test and Evaluation (DOT&E) is required by law to submit a Beyond Low Rate Initial Production (BLRIP) report to the congressional defense committees following IOT&E. The report will provide DOT&E's evaluation of the IOT&E results, and it may recommend further testing and evaluation. If there are deficiencies identified, I will require the Air Force to present their plan to correct the deficiencies, including funding, before I grant approval of Full Rate Production. Future President's Budget submissions to the Congress will reflect these plans and the funding required.

The President's Budget also provides \$4.5B to fund the Joint Strike Fighter (JSF) System Development and Demonstration (SDD) phase in FY05. The JSF allows the Air Force, Navy, and U.S. Marine Corps to reduce the quantity of strike aircraft, increase commonality, and replace their legacy fighter force. The JSF's "four requirement pillars" - survivability, lethality, supportability, and affordability - help to ensure that the JSF air system design will result in the best solution for the warfighter. The reality of a smaller and more common force demands an affordable multi-mission

family of supportable aircraft. The DoD added \$7B in funding to extend the SDD phase, ensuring the JSF design will meet the needs of the three Services and our international partners. By taking the time now to improve the aircraft design, we will make sure we meet the capabilities required of our future force.

The Department clearly understands the significant impact these tactical aircraft programs have on our scarce procurement dollars. The Department evaluates the need for tactical aircraft, including the quantities required, as a part of our routine acquisition and budget processes. These processes include regularly scheduled Defense Acquisition Board (DAB) reviews, which I chair.

As I mentioned earlier, this year the Department will also undertake a broader set of reviews of selected capability areas under the framework of the Joint Capabilities Review process. In future conflicts, we intend to leverage survivability and lethality by using a fully-netted force to move information across communication architectures, creating the effects the commander needs. These aircraft have avionics, software, and computing enhancements compared to today's force, and will provide pilots greater situational awareness as well as providing valuable network information to others. The FY2006 President's Budget will reflect the balanced results of the Department's reviews for these programs.

Unmanned Combat Air Vehicles Activities

This committee has supported the development and uses of many Unmanned aerial vehicles (UAVs). My Director for Defense Systems testified last week on the considerable progress the Department has made in the migration of UAV capability to

the Combatant Commanders. Predator has become one of the most tasked aircraft in the war against terrorism due in large part to its endurance, flexibility, and now limited strike capability. A larger version is under development and will begin weapons testing in the very near future, providing a larger radar array capability to our warfighters. While these systems do not utilize significant stealth capability, they have been and will continue to be increasing effective in low threat conditions. A new program to develop a highly survivable combat UAV has also been recently initiated by the Department. Combining ongoing efforts from the Air Force, Navy and DARPA, the Joint Unmanned Combat Air System (J-UCAS) is an aggressive program to demonstrate the most critical of traditional manned aircraft combat missions. These include Electronic Attack (EA), Suppression of Enemy Air Defenses (SEAD), strike, and high threat Intelligence, Surveillance and Reconnaissance (ISR). These missions pose the greatest risk to our manned aircraft and require extensive strike package elements to assure success. Having completed an Operational Assessment, J-UCAS will provide options in the 2010 timeframe for our future decision makers. This program is part of the Department's overall capability-based process that seeks to match solutions to user needs based on capability areas and not just narrow system-specific requirements.

Export Controls of Joint Strike Fighter

The JSF is a truly international program, with the United Kingdom, Turkey, Norway, Netherlands, Denmark, Italy, Canada and Australia together contributing \$4B to the design phase. Because of the magnitude of the JSF international program, the

Department of Defense (DoD) and the Department of State (DoS) have established an unprecedented interagency coordination process that thoroughly evaluates all proposed U.S. industry export licenses on JSF. Due to the dynamic nature of JSF development, proposed JSF export licenses have, and will continue to be, subject to comprehensive DoS and DoD review prior to DoS approval. The DoS Directorate of Defense Trade Controls, the DoD Defense Technology Security Administration, the Joint Strike Fighter Program Office, and the Departments of the Navy and Air Force are the key participants in this review process.

The JSF System Development and Demonstration (SDD) Memorandum of Understanding (MOU) with the partner nations -- the U.K., Italy, Netherlands, Turkey, Australia, Denmark, Norway and Canada -- establishes a comprehensive, multilateral framework for the protection of JSF technology by partner nation governments and industries.

Both the House International Relations Committee and Senate Foreign Relations Committee staffs have been briefed on the DoS-DoD export control measures used to protect JSF technology, including the JSF SDD MOU and the JSF Global Project Authorization (GPA), approved by the DoS in October 2002. Both the JSF SDD MOU and JSF GPA successfully completed Congressional notification processes required by the Arms Export Control Act. DoD has, and will continue to, place great emphasis on the protection of JSF technology from unauthorized use or transfer.

Joint System Architecture for Electronic Combat Programs

In more than a decade of operations since Desert Storm, the EA-6B has repeatedly demonstrated the value of electronic attacks on adversary defenses. In each of our most recent operations, the EA-6B, together with the overwhelming early use of cruise missiles and air strikes, demonstrated our ability to quickly establish and maintain the air superiority so vital to the pace of modern combat. As the EA-6B continues to age, however, the numbers of available aircraft are quickly declining and the cost to sustain them is rising. At the same time, the diversity of systems that must be countered and the expanded range of new threat missiles dictate a broader, more versatile approach to the delivery of future electronic attack countermeasures. For this reason, and to ensure that the new capabilities can be achieved consistent with the phase out of the EA-6B, the Department has selected a variety of new platforms and subsystems to not only replace the EA-6B, but to expand the options available to the combatant commander for tailored use in deterring and winning conflicts.

This mix includes the EA-18G, a full-frequency range, stand-off and escort asset which will attain Initial Operational Capability (IOC) in FY09; a modified B-52 with advanced standoff jamming pods, of which 16 aircraft and 24 pods are funded in FY05 as a new start with an objective force IOC in FY12. The FY2005 President's Budget also adds to these large, high-powered platforms by funding development of the Miniature Air Launched Decoy – Jammer, an unmanned device that is expected to greatly aid in our ability to expose adversary tactics and positions early on. It will also greatly aid in confusing enemy battle management by distorting the true air picture.

Each of these systems attacks a different element of enemy defenses and decision-making. They will be augmented by upgrades to EC-130H Compass Call and electronic attack payloads on the J-UCAS, as well.

Science and Technology Plan for Tactical Directed Energy Weapons

The science and technology plan for tactical directed energy weapons allows the development of technologies that support the warfighters needs. The plan is focused on projecting lethal force precisely against an enemy with minimal friendly casualties, collateral damage and the use of nonlethal technologies.

Some key efforts include the Advanced Tactical Laser (ATL) Advanced Concept Technology Demonstration (ACTD) that will integrate a moderate-power laser, uncooled optics and existing fire-control systems onboard a C-130 aircraft. This capability will focus on military or law enforcement operations in an urban or suburban environment. The precision of the laser mitigates potential collateral damage, while delivering a non-lethal or lethal force up to 15 kilometers away.

The Tactical Solid-State Laser Weapon technology will demonstrate high-power solid-state laser technologies with the potential to meet the performance, efficiency, and weight/volume requirements for tactical laser weapons integration on air, land, and maritime military platforms. Potential payoffs include a weapon that will provide reduced collateral damage; improved magazine depth; improved standoff for increased survivability of military personnel and assets; and diminished logistics, compared with conventional munitions.

Another key technology area is high power microwaves, which will provide a range of capabilities, including deny, degrade, disrupt or destroy an adversary's electronic targets, and provide nonlethal response capability against personnel. These new capabilities will provide the warfighter with increased mission effectiveness while minimizing collateral damage near the intended target.

The S&T plan for high-energy lasers is coordinated by the High Energy Laser Joint Technology Office. The high power microwave program is coordinated by the High Power Microwave Senior Steering Group. Both of these organizations report to USD(AT&L). The S&T investments supporting the development of directed energy total approximately \$280M in FY05.

Viability of NASA Wind Tunnels

Historically, DoD and the National Aeronautics and Space Administration (NASA) have planned for, and operated complementary wind tunnel test facilities in the United States. NASA maintained those unique facilities.

NASA shut down operation of the National Full - Scale Aerodynamics Complex (NFAC) at the start of FY04. NFAC includes 40' x 80', 80' x 120', and 12' pressurized wind tunnels that are important to S&T programs and aerospace contractors, especially vertical lift programs that require very large scale or full scale test work. NASA's stated intent is to close these facilities if there is not contract work this fiscal year; however, the implementation of 'full cost recovery' accounting has raised the burden of using the facilities without sufficient warning which has severely driven demand down.

The impact of this action is being assessed by the RAND Corporation in response to a congressional mandate and by a study I commissioned last year to be led by Director, Operational Test & Evaluation. The Department's report, in the final stages of approval, shows 9 options, including a recommendation that the Department seek some means of taking over the task from NASA, however, funding would be an issue. The Army is taking the lead in assessing the cost and management implications of DoD management of the facility. I hope to bring this to a successful resolution by the end of the fiscal year.

A-76 Process Reform

The Office of Management and Budget (OMB) has issued a revised OMB Circular A-76, addressing the recommendations made by the Commercial Activities Panel. We believe the revision offers promising improvements to the A-76 process, especially with respect to aligning it more closely with procedures already used under the Federal Acquisition Regulations. The FY04 Defense Authorizations language required the department to report how the new Circular would be implemented prior to the start of any new competitions. The report was provided to Congress this month and addressed the Department's phase-in plan for the revised circular.

Conclusion

In closing, I would like to mention an AT&L initiative that supports and enhances our Tactical Aircraft Programs. When I became Acting Undersecretary I established Seven Goals for AT&L specifically targeted to drive performance

outcomes that will directly contribute to our joint warfighting strategy and the transformation of our DoD business processes. These Seven Goals are:

1. Acquisition Excellence with Integrity
2. Logistics Integrated and Efficient
3. Systems Integration and Engineering for Mission Success
4. Technology Dominance
5. Resources Rationalized
6. Industrial Base Strengthened
7. Motivated, Agile Workforce

I have set these goals to complement and facilitate Secretary Rumsfeld's business transformation and joint warfighting objectives and, even more fundamentally, to ensure that the resources entrusted to the department are well managed and wisely used.

I would like to briefly highlight Goal Three, "Systems Integration and Engineering for Mission Success." In February of this year, I established as a matter of policy the requirement for all acquisition programs to apply a robust systems approach that balances total system performance and total ownership costs within the family-of-systems, systems-of-systems context. This context will improve the explicit integration of complex systems by establishing net-readiness requirements and common interfaces as integral portions of a system's design. To implement that policy I have established a new Systems Engineering Directorate and have charged them with driving good systems engineering practice back into the way we do business. While

all Seven goals will guide our efforts in Tactical Aircraft Programs, I look to our systems engineering initiatives, in particular, as enabling the acquisition of these complex systems so that they meet user needs affordably.

Thank you for this opportunity to provide a written statement to the Committee.

NOT FOR PUBLICATION UNTIL RELEASED BY THE
HOUSE ARMED SERVICES COMMITTEE
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

STATEMENT OF

THE HONORABLE JOHN J. YOUNG, JR.
ASSISTANT SECRETARY OF THE NAVY
(RESEARCH, DEVELOPMENT, AND ACQUISITION)

AND

VADM JOHN B. NATHMAN
DEPUTY CHIEF OF NAVAL OPERATIONS
WARFARE REQUIREMENTS AND PROGRAMS

AND

LTGEN MICHAEL A. HOUGH
DEPUTY COMMANDANT FOR AVIATION

BEFORE THE

TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

OF THE

HOUSE ARMED SERVICES COMMITTEE

ON

FY 2005 NAVY & MARINE CORPS TACTICAL AVIATION PROGRAMS

MARCH 25, 2004

NOT FOR PUBLICATION UNTIL RELEASED BY THE
HOUSE ARMED SERVICES COMMITTEE
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

Mr. Chairman, distinguished members of the Subcommittee, thank you for this opportunity to appear before you to discuss the Department of the Navy's Fiscal Year (FY) 2005 Acquisition and RDT&E programs.

Your Navy and Marine Corps Team's outstanding performance in the Global War on Terrorism (GWOT) and Operations ENDURING FREEDOM (OEF) and IRAQI FREEDOM (OIF) last year underscored the high return on your investment in our combat readiness, our people, and our unique maritime warfighting capabilities. Your return on investment included the lift for 94 percent of the nation's joint warfighting capability and more than 8000 Naval combat sorties in support of OIF. It demonstrated the latest technology in surveillance, command and control and persistent attack operating from sovereign U.S. territory and exploiting the vast maneuver space provided by the sea.

The GWOT, OEF and OIF demonstrated the enormous contributions Naval forces make to the effectiveness of joint and coalition forces. Analyses of these conflicts indicate that the war fighting concepts, capabilities development process, and advanced technologies we are pursuing in our Naval Power 21 vision are on the right vector. Experimentation with forward deployed Expeditionary Strike Groups has increased credible global combat capability with which to fight the war on terror and project power. We have leveraged OIF experience to implement the Fleet Response Plan – increasing the number of Carrier Strike Groups deployed or readily deployable. The Navy and Marine Corps Team now faces a rare inflection point in history with technological infusions and several new ship classes coming on line within the next few years. This year, we will pursue distributed and joint networked solutions that could revolutionize our capability. With the FY 2005 Budget request we intend to:

- **Shape the 21st Century workforce** and deepen the growth and development of our people, and
- **Accelerate our investment in Naval Power 21 to recapitalize and transform** our force and improve its ability to operate as an effective component of our joint war fighting team.

Developing Transformational Joint Seabasing Capabilities

The **Naval Power 21** vision defines the capabilities that the 21st Century Navy will deliver. Our overarching transformational operating concept is **Seabasing**: a national capability, for projecting and sustaining naval power and joint forces that assures joint access by leveraging the operational maneuver of sovereign, distributed, and networked forces operating globally from the sea. Seabasing unifies our capabilities for projecting offensive power, defensive power, command and control, mobility and sustainment around the world. It will enable commanders to generate high tempo operational maneuver by making use of the sea as a means of gaining and maintaining advantage.

Sea Shield is the projection of layered defensive power. It seeks maritime superiority to assure access, and to project defense overland.

Sea Strike is the projection of precise and persistent offensive power. It leverages persistence, precision, stealth, and new force packaging concepts to increase operational tempo and reach. It includes strikes by air, missiles, and by maneuver by Marine Air Ground Task Forces (MAGTF) supported by sea based air and long-range gunfires.

Sea Base is the projection of operational independence. It provides the Joint Force Commander the capability to retain command and control and logistics at mobile, secure locations at sea and enables Expeditionary Maneuver Warfare and Ship-To-Objective-Maneuver (STOM).

FORCENet is the operational construct and architectural framework for naval warfare in the joint, information age. It integrates warriors, sensors, networks, command and control, platforms and weapons into a networked, distributed combat system.

Sea Trial is the Navy's recently created process for formulating and testing innovative operational concepts, most of which harness advanced technologies and are often combined with new organizational configurations, in pursuit of dramatic improvements in warfighting effectiveness. Sea Trial concept development and experimentation (CD&E) is being conducted in close coordination with, the Marine Corps combat/force development process and reflects a sustained commitment to innovation. These efforts tie warfare innovation to the core operational challenges facing the future joint force.

Sea Enterprise is the flagship effort for freeing up additional resources to support military transformation initiatives through streamlining naval business processes. Involving the Navy Headquarters, the systems commands and the Fleet, Sea Enterprise seeks to improve organizational alignment, refine requirements and reinvest savings to buy the platforms and systems needed to transform the naval contribution to the joint force.

As a means of accelerating our investment in Naval Power 21, we employ the Naval Capability Development Process (NCDP) and Expeditionary Force Development System (EFDS). The Naval Capability Development Process and EFDS take a concepts-to-capabilities approach to direct investment to achieve future warfighting wholeness. The NCDP takes a sea-based, offensive approach that provides power projection and access with distributed and networked forces featuring unmanned and off board nodes with penetrating surveillance via pervasive sensing and displaying that rapidly deliver precision effects. The EFDS assesses, analyzes and integrates MAGTF warfighting concepts, and requirements in a Naval and joint context to support the overarching operational concept of Joint Seabasing. Both processes are designed to incorporate innovative products of Service and Joint Concept Development and Experimentation (CD&E) and Science and Technology (S&T) efforts.

The FY 2005 Budget request reflects the investments that will most improve our warfighting capability by developing and investing in future sea based and expeditionary capabilities for the Navy and Marine Corps.

AVIATION PROGRAMS

The FY 2005 President's Budget request balances continued recapitalization in obtaining new capabilities and reducing operating costs while simultaneously sustaining the legacy fleet aircraft that are performing magnificently in current operations. Taking advantage of multi-year procurement (MYP) to achieve significant savings in procurement accounts, the Navy has entered, or will soon enter numerous MYP contracts that will define the future of weapons systems and further investment. The Department's FY 2005 Budget request will utilize MYP arrangements for the F/A-18E/F (both airframe and engine), the KC-130J and the E-2C to maximize the return on our investment. Our proposed plan will procure 44 tactical, fixed wing aircraft (42 F/A-18E/F, and two E-2C), as well as eight MV-22, and nine upgraded UH-1Y/AH-1Z helicopters. This plan also continues the development of the F-35, the E-2C Advanced Hawkeye, the EA-18G, Multi-mission Maritime Aircraft (MMA), and the Aerial Common Sensor (ACS) and initiates the Broad Area Maritime Surveillance (BAMS) Unmanned Aerial Vehicles (UAV) development.

SEA SHIELD

Multi-mission Maritime Aircraft (MMA)/P-3C

Current P-3 aircraft are flying in excess of 150 hours per month in support of OEF and OIF. This high flight utilization requires special structural inspections to keep the aircraft safely flying and the Navy has developed a comprehensive sustainment, modernization, and re-capitalization plan for the force. The FY2005 Budget request reflects \$56.9 million for Special Structural Inspections (SSI) and Special Structural Inspections - Kits (SSI-K), which will allow for sustainment and continued operation of approximately 148 aircraft. The FY2005 Budget request also reflects \$53.8 million for ASW Improvement Program (AIP) to continue to meet COCOM requirements. To replace these critical aircraft, the Navy is procuring an MMA. The program is completing Component Advanced Development (CAD) and in December 2003 received proposals for the System Development and Demonstration (SDD) contract from both competitors (Boeing with 737 commercial derivative and Lockheed-Martin with Orion 21 military derivative). Evaluations of these proposals are ongoing to support down select to final system provider and contract award after Milestone B in May 2004. The FY 2005 Budget requests \$496 million for continuation of SDD of MMA. Our comprehensive and balanced approach has allowed for re-capitalization of these critical assets.

MH-60R and MH-60S

The FY 2005 Budget requests \$409 million in procurement and \$79 million in RDT&E for the replacement and upgrade of Light Airborne Multi-Purpose System (LAMPS) MK III SH-60B and carrier-based SH-60F helicopters to the new configuration designated as MH-60R. Procurement quantity was reduced to mitigate delays in developmental and operational testing. Testing identified stability issues with the Multi-mode Radar (MMR) and software performance issues with MMR/IFF Interrogator, electronic support measures and acoustic systems. FY 2005 funding will fully support a revised procurement profile.

The FY 2005 Budget requests \$400 million in procurement and \$81 million in RDT&E funds for the MH-60S, which is the Navy's primary combat support helicopter designed to support Carrier and Expeditionary Strike Groups. It will replace a number of legacy platforms with a newly manufactured H-60 airframe. The MH-60S program entered into a full rate five-year MYP contract with the Army in September 2002, for up to 237 aircraft. The FY 2005 Budget request supports the recently awarded MH-60 Common Cockpit MYP. The \$423 million contract delivers common cockpits for both MH-60R and MH-60S aircraft, saving the Navy up to \$63 million.

AIM-9X

The FY 2005 Budget requests \$35.2 million for 157 missiles. AIM-9X was deployed to operational sites last summer after a successful LRIP 4 decision. Test asset availability that slowed the Operational Test was overcome, and the OPEVAL completed in late summer. The Full Rate Production decision is scheduled for March 2004.

SEA STRIKE

F/A-18 E/F

The F/A-18E/F is a significant step forward in improving the survivability and strike capability of the carrier air wing. The Super Hornet provides a 40 percent increase in combat radius, 50 percent increase in endurance, and 25 percent increase in weapons payload over our older Hornets. Three Super Hornet squadrons deployed during OIF as Fleet transition of the F/A-18E/F continues. The latest squadron to stand up is based with the carrier air wing forward deployed in Japan.

The FY 2005 Budget requests \$2.98 billion for 42 F/A-18 E/F aircraft for the first year of the second five-year MYP contract (FY 2005 to FY 2009). The Super Hornet has used a spiral development approach to incorporate new technologies, such as the Joint Helmet Mounted Cueing System, ATFLIR, Shared Reconnaissance Pod System (SHARP) and Multifunctional Information Distribution System data link. Last year, the ATFLIR successfully passed the Full Rate Production decision, while the Advanced Electronically Scanned Antenna Radar system received Low Rate Initial Production (LRIP) authority and the SHARP pod completed a successful Early Operational Capability (EOC) onboard USS NIMITZ with VFA-41.

F-35 Joint Strike Fighter (JSF)

Our recapitalization plan includes the JSF, a stealthy, multi-role fighter aircraft designed jointly to be an enabler for Naval Power 21. The FY 2005 Budget request contains \$2.2 billion for continuation of SDD on the JSF. The JSF will enhance the Department of the Navy's precision strike capability with unprecedented stealth, range, sensor fusion, improved radar performance, combat ID and electronic attack capabilities compared to legacy platforms. CV JSF complements the F/A-18E/F and EA-18G in providing long range strike capability and much improved persistence over the battlefield. STOVL JSF combines the multi-role versatility of the F/A-18 and the basing flexibility of the AV-8B. The commonality designed into the JSF

program will reduce acquisition and operating costs of Navy and Marine Corps tactical aircraft and allow enhanced interoperability with our Allies and sister Services.

The JSF has completed the second year of its development program, and the program continues working to translate concept designs to three producible variants. The JSF development activities for propulsion, subsystems, avionics, and autonomic logistics have gone well. The Air System Preliminary Design Review was completed in June 2003, and the F135 First Engine to Test was successfully completed in October 2003. The airframe design effort, however, is taking longer and is more complex than had been originally anticipated. Additional design work is required to address technical issues, primarily weight projections, resulting in a SDD cost increase, SDD schedule delays, and a one-year slip to starting LRIP to FY 2007 vice FY 2006. These technical issues have put pressure on our ability to meet several performance specification requirements as well as some Key Performance Parameters. We believe current issues are solvable within normal parameters of design fluctuation and we are re-planning JSF SDD to make sure we succeed. Specifically, our SDD plan recognizes that STOVL performance is absolutely vital. As such, we are focused to ensure STOVL viability for our warfighters; aggressively pursuing trade studies to improve performance by reducing weight; and aggressively pursuing propulsion enhancements to improve performance. An independent review team is also examining the program to make sure we are following the correct path.

V-22

The FY 2005 Budget request includes \$918 million for eight MV-22s and \$304 million for continued testing and evaluation. The V-22 Osprey resumed flight-testing in May 2002, and it has flown in excess of 1500 hours. Flight-testing continues along an event-driven schedule and is going well. In August 2003, OSD directed the Services to reduce the number of aircraft from 20 to 17 in FY 2006. Subsequently, the aircraft procurement ramp should increase by approximately 50 percent per year and use the savings accrued from the production adjustments for reinvestment into program interoperability improvements and cost reduction initiatives.

CH-53X

The FY 2005 Budget requests \$103.1million RDT&E to begin the SDD phase of the CH-53X program. The Marine Corps' CH-53E continues to demonstrate its value as an expeditionary heavy-lift platform, with significant assault support contributions in Afghanistan, the Horn of Africa and Iraq. Vertical heavy lift will be critical to successful 21st Century operations in anti-access, area-denial environments globally, enabling force application and focused logistics envisioned within the joint operating concepts. The CH-53E requires significant design enhancements to meet future interoperability requirements, improve survivability, expand range and payload performance, improve cargo handling and turn-around capabilities and reduce operations and support costs. An independent Analysis of Alternatives determined that a "new build" helicopter would be the most cost-effective solution. The Operational Requirements Document that will guide the development of this aircraft is in review. The CH-53X series aircraft will address our emerging heavy-lift requirements.

F/A-18 A/B/C/D

The FY 2005 Budget request contains \$19.9 million for the continuation of the upgrade program for our F/A-18 As. The Marine Corps continues to upgrade Lot 7-11 F/A-18As (with a program objective of 76) to Lot XVII F/A-18C aircraft capability as well as digital communications and tactical data link. The Marine Corps anticipates programmed upgrades to enhance the current capabilities of the F/A-18C/D with digital communications, tactical data link and tactical reconnaissance systems. This upgrade ensures that our F/A-18s remain viable and relevant in support of TACAIR Integration and Expeditionary Maneuver Warfare. The Marines expect the F/A-18A to remain in the active inventory until 2015. The Marines are also exploring the feasibility of placing the LITENING targeting pod on the F/A-18D aircraft. When combined with data link hardware from Predator UAVs, this pod provides real time video to the ground commander and serves as an interim solution to support real world operations until the Advanced Targeting Forward Looking Infrared (ATFLIR) pod is operationally fielded in sufficient numbers. This new start notification has been sent to Congress.

Integrated Defensive Electronic Countermeasures (IDECM)

The FY2005 Budget reflects \$13.4 million in RDT&E to continue the development of the IDECM Block III (ALQ-214 w/ the ALE-55 (fiber optic towed decoy)) that will support an FY 2006 OPEVAL. Additionally, \$99 million in APN is included for the procurement of 38 ALQ-214 systems, and \$9 million in PANMC for the procurement of 400 ALE-50 towed decoys. ALE-55 procurement is scheduled for FY 2006. Congress added \$9 million to RDT&E, N in the FY 2004 budget for the IDECM program. This funded resolution and testing of (then) remaining technical issues. As a result, OPEVAL was completed and the IDECM Block II OPEVAL Report was signed October 3, 2003, with both a finding of "Operationally Effective and Operationally Suitable", and a recommendation for fleet introduction. IOC is planned for September 2004. Full Rate Production deliveries begin in FY 2005.

EA-18G

The E/A-18G is the Navy's replacement for the EA-6B Airborne Electronic Attack aircraft and represents an entirely new way of looking at legacy aircraft replacement. Leveraging existing production capabilities at Boeing and Northrop Grumman, the Navy is using the F/A-18E/F MYC to buy an additional quantity of 'F' Aircraft, and marrying those airframes with Northrop Grumman's in-production Improved Capabilities (ICAP)-III Airborne Electronic Attack (AEA) system to produce the E/A-18G to replace the aging EA-6B aircraft. This allows us to deliver the next generation Airborne Electronic Attack capability at reduced cost and in the shortest possible timeframe. The Marine Corps is examining a range of possibilities that will provide the needed capability.

The FY 2005 Budget request reflects \$359 million for SDD leading to Critical Design Review currently planned for April 2005. During FY 2004, EA-18G efforts focused on risk reduction and development activities concerning the integration of EA-6B Improved Capabilities (ICAP III) electronic attack technologies into the F/A-18E/F air vehicle. The EA-18G was approved to enter SDD on December 18, 2003, as an ACAT ID program. A total quantity of 30

systems will be procured in LRIP with a planned FY 2009 IOC and FY 2012 FOC. The EA-18G will replace carrier-based Navy EA-6B aircraft by 2012.

AH-1Z / UH-1Y / Existing Marine Corps Helicopters

The FY 2005 Budget requests \$241.8 million APN funds to procure 9 UH-1Y/AH-1Z aircraft and \$90.4 million RDT&E funds to complete the H-1 Upgrades test program. The Engineering and Manufacturing Development phase of the H-1 Upgrades Program to remanufacture 180 AH-1W and 100 UH-1N helicopters into state-of-the-art AH-1Z and UH-1Y models is progressing well. The development program is over 90 percent complete and the aircraft are meeting all Key Performance Parameters. Cost and schedule performance projections are tracking well to the Performance Measurement Baseline. LRIP Lot I was approved in October 2003, with the contract awarded to Bell Helicopter in December 2003. The technical performance of the flight test remains strong with the five flight test aircraft completing over 1500 flight hours during combined contractor/government testing at Patuxent River, MD, and completing the Block "C" modification that added the Helmet-Mounted Sight/Display and active elevator. The program is on track for a second Operational Assessment in April 2004, followed by an LRIP Lot II decision planned for November 2004.

The Marine Corps continues to support its fleet of existing of UH-1N, AH-1W, CH-53E, CH-53D and CH-46E helicopters with numerous enhancements and Operational Safety Improvement Programs (OSIPs). As an example, the FY 2005 Budget requests \$56.4 million for the CH-46E T-58 Engine Reliability Improvement Program; this program will restore the capability of these engines to their original power specifications and reduce maintenance requirements.

AV-8B

The FY 2005 Budget requests \$12.3 million RDT&E funds to support development of the Tactical Moving Map Display and the Engine Life Management Plan and \$20.8 million APN funding for procurement of Open Systems Core Avionics Requirement (OSCAR) and Engine Life upgrades. The AV-8B we fly today is not the same aircraft that we flew 10 years ago. Over the last decade, the Harrier has gone from a daytime air-ground attack aircraft to a night/adverse weather precision strike platform. The AV-8B Remanufacture Program not only updated the Harrier to a more capable and more reliable aircraft, but also provided an additional 6000 hours of airframe life, making the AV-8B one of the newest airframes in the Fleet. Today's AV-8B includes a night-attack avionics suite (Navigation FLIR, digital moving map, color displays, night vision goggle lighting), APG-65 multi-mode radar, a more powerful and reliable Pegasus (408) engine, and the Litening targeting pod. The AV-8B OSCAR program, currently in LRIP, will also add new Mission Systems and Warfare Management Computers, open systems architecture and commercial software and JDAM capability. Our AV-8B Harriers have flown extensively in support of Special Operations Forces in Operation ENDURING FREEDOM (OEF), as well as during OIF last year. AV-8B's demonstrated the expeditionary flexibility of Short Take-Off/Vertical Landing (STOVL) aircraft while becoming the most forward deployed tactical aircraft in theater. Several Harriers employed Litening targeting pods with real-time

video downlink capability that provided visual target verification by ground personnel. The Litening pods' inherent capability to laser designate targets for precision munitions also marked spots on the ground with infrared energy.

EA-6B

The FY 2005 Budget requests \$51.7 million for Wing Center Section modifications and \$53 million for procurement of 10 Improved CAPability (ICAP) III systems. The aging EA-6B has been in ever-increasing demand as DoD's only tactical radar jamming aircraft that also engages in communications jamming and information operations. This demand has been particularly evident during OIF and OEF. Safety considerations, due to wing center section and outer wing panel fatigue have driven aircraft inventory (aircraft available to the fleet) from 95 to 71. Aircraft inventory is projected to return to above 90 by the first quarter of FY 2006. Congress provided a \$85 million supplemental in FY 2004 that has accelerated the procurement and installation efforts to replace both wing center sections and outer wing panels. Priorities for this platform are current readiness and successful fleet introduction of ICAP III selective reactive jamming system. The Marine Corps expects to fly the EA-6B ICAP III until transitioning to a new electronic attack aircraft yet to be determined.

Precision Munitions

Precision Guided Munitions (PGMs) are where the effects of decisive power "*From the Sea*" are realized most clearly. From more than 870 Tomahawks fired from more than 35 surface and subsurface combatants to thousands of other Navy PGM's deployed in OEF and OIF, PGM's provided key Navy combat strike power and lethality.

The Navy made investments in PGMs to ramp-up production for OEF/OIF and subsequently support on-going replenishment of needed wartime expended inventories. Due to the effectiveness of the Navy PGMs and the ways in which they were employed in combat, we did not use as many as we had expected. Therefore, we now find ourselves able to reduce the procurement rate for refilling our required inventories.

The FY 2005 Budget request will continue to enhance the Navy's war-fighting capability by supporting on-going production programs, improving existing PGMs and establishing new programs. All of these PGM programs will facilitate continued domination in the maritime environment, support in-land operational forces and enhance the overall department strategy to deter and dissuade potential adversaries while supporting our allies and friends.

Joint Standoff Weapon (JSOW)

The FY 2005 Budget requests \$9.5 million for development and integration of the Selective Availability Anti-Spoofing Module (SASSM), and \$74.6 million for procurement of 216 JSOW-A missiles and \$64.8 million for procurement of 173 JSOW-C missiles. The FY 2005 Budget request supports continued production of the combat proven JSOW-A submunition variant and continued development of the new JSOW-C penetrator variant. We approved JSOW-C for LRIP in June 2003 and plan for Full Rate Production approval in 2004.

Advanced Anti-Radiation Guided Missile (AARGM)

The FY2005 Budget request of \$61.5 million supports ongoing development of the next generation anti-radiation missile. It should be noted that recently, the AARGM successfully demonstrated its ability to ignore a friendly radar site yet destroy an enemy radar site that had shut down in an effort to avoid attack. Additional funding in the FY 2005 Budget request enables acceleration of the IOC from FY 2010 to FY 2009.

Joint Common Missile (JCM)

The FY 2005 Budget requests \$82.8 million for JCM development. The FY 2005 Budget request reflects increased support for the development of the JCM that is planned for use by Navy, Marine Corps and Army aviation assets to close a capability gap in precision point attack for fixed-wing and rotary-wing aircraft against time critical, moving and short-dwell relocatable targets. The Milestone B decision is planned for March 2004.

Other Direct Attack PGM's

The FY 2005 Budget requests \$151.2 million for procurement of Joint Direct Attack Munition (JDAM) Kits and \$60.2 million for procurement of Laser Guided Bomb (LGB) Kits. The FY 2005 Budget request for other PGM hardware such as the JDAM and LGB Kits reflects adequate support for the production of these essential combat-proven weapons.

Tactical Tomahawk

The FY 2005 Budget requests \$256.2 million for 293 missiles, an increase of \$64 million and 75 missiles over the amount projected for FY 2005 in the FY 2004 budget. Tactical Tomahawk represents a tremendous improvement over the successful Block III Tomahawk cruise missile. The state-of-the-art components allow reduced response time, multiple pre-planned outcomes, and improved lethality and navigation improvements through innovations in manufacturing and production techniques. We have committed to replenish our precision-guided munitions inventories and we will utilize a multi-year acquisition strategy to maximize the quantity of Tomahawk missiles procured. The Full Rate Production decision is on track for June 2004. Additionally, we are in the final stages of our second remanufacture program; converting all available older Tomahawk airframes to the latest Block III configuration. This effort will be complete in May of this year and will yield an additional 456 missiles.

SEA BASE

KC-130

The FY 2005 Budget requests \$324 million for four KC-130J Hercules aircraft. These aircraft will be procured as part of an existing Air Force MYC. The Marine Corps has taken delivery of 13 KC-130J aircraft and has an additional 25 planned for procurement within the FYDP. The KC-130 fleet once again proved itself as a workhorse during operations in Iraq. The KC-130J provides a major enhancement to this proven platform, extending its range, payload, and refueling capabilities. Bold steps in simulator training and joint flight instruction place the

KC-130J program on the leading edge of the transformation continuum. Additionally, we have continued to ensure the tactical capability of our existing KC-130F, R and T series aircraft by installing night vision kits and upgraded Aircraft Survivability Equipment.

C-40

The FY 2005 Budget requests \$65.4 million for one C-40 (Boeing 737-700C). This aircraft replaces the aging C-9 providing intra-theater logistics support. The Navy has taken delivery of six with two more on contract. An additional six are planned for procurement in the FYDP.

FORCEnet

E-2C and Advanced Hawkeye

A critical enabler of transformational intelligence, surveillance and reconnaissance, the E-2C Advanced Hawkeye (AHE) program will provide a robust overland capability against current and future cruise missile-type targets. The AHE program will modernize the E-2 weapons system by replacing the current radar and other system components to maintain open ocean capability while adding transformational surveillance as well as theater air and missile defense capabilities.

The FY 2005 Budget requests \$248 million to procure one E-2C and one TE-2C as the second year of a four-year MYP. This effort will keep the production line viable while the E-2 Advanced Hawkeye (AHE), formerly known as the Radar Modernization Program, continues spiral development toward an Initial Operational Capability (IOC) in FY 2011. Congressional notification of full funding and economic rate was sent in January 2004. The MYP contract was awarded on January 22, 2004. A critical enabler of transformational intelligence, surveillance and reconnaissance, the E-2C AHE program will provide a robust overland capability against current and future cruise missile-type targets. The AHE program will modernize the E-2 weapons system by replacing the current radar and other system components to maintain open ocean capability while adding transformational surveillance as well as theater air and missile defense capabilities. The AHE program successfully entered the SDD phase in June 2003. Further, open architecture standards are being integrated into our E-2C aircraft and the AHE program to improve interoperability with DoD systems.

Aerial Common Sensor (ACS)/EP-3

The FY 2005 Budget requests \$25 million for Joint requirements for ACS aircraft development. ACS is a joint program with the Army that will replace the EP-3E aircraft. It will provide a transformational multi-intelligence platform capable of providing strike support and Direct Threat warning to the war fighter. The ACS is in a competitive source selection between Lockheed-Martin's Embraer 145-CS and Northrop Grumman's Gulfstream 450 RC-20 and a source select decision is scheduled for May 2004. The Navy will report to a Milestone Decision Authority for an Interim Program Review in October 2004.

Unmanned Aerial Vehicles (UAV)

The GWOT continues to place emphasis on the importance of UAVs. The FY 2005 Budget request reflects our commitment to a focused array of UAVs that will support and enhance both surveillance and strike missions with persistent, distributed, netted sensors. The Navy's UAV programs are focused on two areas.

Broad Area Maritime Surveillance (BAMS) UAV

The FY 2005 Budget requests \$113.4 million for development of the BAMS UAV. The BAMS UAV program will meet the Navy requirement for a persistent intelligence, surveillance and reconnaissance (ISR) capability as well as address the growing ISR gap and the shortfall in maritime surveillance capability. The BAMS UAV System will be a force multiplier for the Fleet Commander, enhancing situational awareness of the battle-space and shortening the sensor-to-shooter kill chain. BAMS UAV will work as an adjunct to the new MMA to provide a more affordable, effective and supportable maritime ISR option than current ISR aircraft provide. The BAMS UAV System is intended to be a Navy fleet asset for tactical users such as the ESG, the CSG and the Joint Forces Maritime Component Commander (JFMCC).

Fire Scout UAV

The FY 2005 Budget requests \$42.9 million to continue development of the Fire Scout UAV. The Fire Scout is a Vertical Takeoff and Landing Tactical UAV (VTUAV) designed to operate from all air-capable ships, carry modular mission payloads, and operate using the Tactical Control System and Tactical Common Data Link. The Fire Scout UAV will provide day/night real time ISR and Targeting as well as communication-relay and battlefield management capabilities to support core Littoral Combat Ship (LCS) mission areas of ASW, MIW and ASUW for the Naval forces. Upgrades will include four-bladed rotor, increased payload capacity, and weaponization to address small surface threats. Upgraded Fire Scout capability will be fielded with LCS Flt 1 in FY 2010. The Navy Fire Scout program plans coordination with the U.S. Army Future Combat System program.

Marine Corps UAV

The Marine Corps continues to examine options for the sustainment and eventual replacement of its aging Pioneer fleet. Pioneer flew more than 2,350 hours in support of Operation Iraqi Freedom I, highlighting the criticality of these systems for our Marine forces. Requirements for Vertical Unmanned Aerial Vehicle (VUAV) are being developed in consonance with Ship to Objective Maneuver concepts from Expeditionary Maneuver Warfare and with lessons learned from recent operational experience.

Joint Unmanned Combat Air System (JUCAS)

The Department is committed to a Joint Unmanned Combat Air System (JUCAS) initiative, developed in partnership with the Air Force. The Navy and the Air Force have defined a common set of science and technology requirements that recognizes the unique needs of each Service. This work will support a competitive acquisition strategy for a JUCAS program.

OTHER SIGNIFICANT CAPABILITIES

T-45

The FY 2005 Budget requests \$254 million for eight T-45 aircraft. The request also includes full funding for the Required Avionics Modernization Program (RAMP). A performance-based logistics contract was awarded to L3 COM Corporation for the airframe and Rolls Royce for the engine in July 2003. This enhanced Performance based Logistics concept will provide cost wise readiness and save the DoD approximately 10% over the previous contract.

Presidential Helicopter Replacement Aircraft (VXX)

The FY 2005 Budget requests \$777.5 million RDT&E for SDD efforts on the VXX program. The goal of this accelerated program is to introduce a new Presidential Airlift aircraft by end of Calendar Year (CY) 2008. The VXX program will utilize an evolutionary acquisition approach through a two-part incremental development to meet this need. The goal of the VXX development is to deliver a safe, survivable and capable vertical lift aircraft while providing uninterrupted communications with all required agencies. The Department is currently reviewing and adjusting the acquisition strategy and plans to extend the risk reduction phase to enable a lower risk, higher confidence source selection decision and acquisition program.

SEA TRIAL AND SEA ENTERPRISE IN ACTION: OPERATION RESPOND

In support of the I Marine Expeditionary Force's (I MEF) return to Iraq scheduled to begin March 2004, and in support of deployed Marines in Afghanistan, the Secretary of the Navy directed the establishment of a formalized process and action team, "OPERATION RESPOND", to rapidly respond to technological and materiel requirements generated from deployed Marines. A senior Navy-Marine Corps team co-chaired by the Assistant Secretary of the Navy (Research, Development and Acquisition) and the Deputy Commandant for Combat Development will review and coordinate technical and materiel requirements for deployed units and utilize the technical and engineering expertise throughout the Department of the Navy and industry to expedite the best solutions available to counter rapidly evolving threats. This process will leverage and expand the current roles and capabilities of our established requirements generation and materiel development and acquisition commands in order to better respond to innovative enemy threats.

Intelligence, Surveillance, and Reconnaissance (ISR)

The Marine Corps will be rapidly fielding a number of systems to provide enhanced ISR capabilities in the theater of operations. These systems include Unmanned Aerial Vehicles (UAVs), such as Dragon Eye and an ONR developed vehicle, Silver Fox. A recent demonstration of the Scan Eagle UAV went very well and I MEF is preparing an Urgent Needs Statement for the system. The Marines also plan to employ aerostat balloons and possibly smaller, Army Rapid Equipping Force-derived platforms to provide persistent ISR coverage.

Aircraft Survivability Equipment (ASE)

The Navy and Marine Corps aviation has partnered with industry to expedite the application of ASE on the Marine Corps rotary and fixed wing aircraft deploying to the CENTCOM area as part of the MEF's Aviation Combat Element (ACE). Rotary wing aircraft will have the requisite ASE installed by industry teams prior to their departure, enroute on ships, upon arrival in-theater, or shortly after their arrival in-theater. KC-130 aircraft, which were not planned to receive ASE upgrades, will now receive some ASE upgrades initially shortly after they arrive in-theater and additional design work is being completed for full upgrades to be applied while in-theater.

SUMMARY

Our Naval forces are unique in their contribution to the Nation's defense. Versatile Naval expeditionary forces are the nation's first responders, relied upon to establish the tempo of action, control the early phases of hostilities, and set conditions for decisive resolution. America's ability to protect its homeland, assure our friends and allies, deter potential adversaries, and project decisive combat power depends on maritime superiority. The transformation of Naval forces is dedicated to greatly expanding the sovereign options available worldwide to the President across the full spectrum of warfare by exploiting one of our Nation's asymmetric advantages – control of the sea. The transformation of our Naval forces leverages enduring capabilities for projecting sustainable, immediately employable joint combat power by facilitating the accelerated deployment and flexible employment of additional joint capabilities through a family of systems and assets afloat. Our FY 2005 Budget request seeks to accelerate our investment in Naval Power 21 to transform our force and its ability to operate as an effective component of the joint war fighting team. Congressional support of this plan is essential to achieving this vision – I thank you for your consideration.

Committee: House Armed Services Committee – Tactical Air and Land Forces Subcommittee
Subject: Fiscal 2005 Defense Authorization: Tactical Weapons Systems

Testimony:

Statement of Dr. Marvin Sambur Assistant Secretary of the Air Force Acquisition
March 24, 2004

Chairman Weldon, Ranking Member Abercrombie and Members of the Subcommittee

Introduction

Thank you for this opportunity to discuss with you and your subcommittee today, the Air Force's Tactical Weapons Systems. I'm also happy to report to you in this written statement, some of the successes and outstanding efforts of your Air Force Professionals as we strive to improve the way we do business, while transitioning critical technology to warfighting capability. General Keys and I are proud to come before you today and discuss our plan for maintaining the United States Air Force as the dominant air force in the world. We seek your committee's support. Together we can achieve the mutual commitment necessary for those critical programs that ultimately deliver on the promise of warfighting capability that ensure victory when necessary.

Throughout the past year, we have made progress toward achieving my vision of a more efficient and effective acquisition process. Despite numerous challenges, we succeeded in developing new capability for, and in many instances transitioning that capability to, the joint warfighter. As I will shortly describe, my staff and I continue to seek ways to improve our

approach to the acquisition process, institutionalizing an enterprising paradigm and enjoying individual successful outcomes along the way. In this manner, we do our part in serving our Nation's defense.

We have continued to play a starring role in the Air Force core competency of turning technology into warfighting capability. The challenge, which we confidently embrace, remains doing so amidst the often-unpredictable dynamics of world events, business interests, technology maturation, and public support. And despite these challenges, I can assure you that we in the Air Force stand as committed as ever to meet those challenges of today, as well as tomorrow, and to follow the direction provided by our Secretary of Defense.

Agile Acquisition Update

During similar testimony last year, I told of a mandate given me by the Secretary and Chief of Staff of the Air Force to change the way we in Air Force Acquisition do business. Our programs have all-too-often suffered from development cost and schedule overruns, which have in turn led to fielding delays, fewer production quantities, and even reduced capability. I identified and presented several root-cause factors that I believe can lead to poor program execution and subsequently laid out a series of policies instituted to address these underlying causes. These areas included unstable requirements, lack of test community buy-in, inadequate system's engineering, unstable funding, and faulty cost estimates. By getting a handle on these problems, our intent was, and still is, to bring back stability and credibility to our modernization efforts.

The goal is simple, if difficult: deliver what we promise, when we promise. I'm pleased to report on our progress this past year in addressing the areas identified above.

Stakeholder Collaboration

During similar testimony last year, I emphasized the importance of establishing and fostering collaboration as an enabling theme in our quest to achieve “Agile Acquisition.” We believe that greater cooperation among stakeholders in defining priorities and key requirements, especially as they inform development of a capability-based acquisition strategy, is of paramount importance. For the first time ever, during the past year the Acquisition and Operations communities collaborated on simultaneous revisions to regulations governing their respective portions of the capabilities acquisition system. High Performance (Integrated Product) Teams (HPT) with members from all stakeholder organizations were formed to work on these efforts, synchronizing all the policies and making clear along the way that speed and credibility are the underpinning of what we do. The goal was simple: a seamless, collaborative process that smoothly implements the DoD 5000 series and the Joint Capabilities Integration and Development System (CJCSI 3170.01C). As might have been expected, we found that the very exercise of bringing these regulations into harmony has served to open vital lines of communications and collaboration that we expect to pay dividends in the future.

In fact, General Keys and I have jointly signed out a policy statement that further stipulates how this collaborative environment will be put into practice. System acquisition management plans and acquisition strategies will be routinely developed using the HPT process. The responsible acquisition organization will convene the same HPT that initially developed the required operational capability to subsequently generate acquisition courses of action (COA) (COAs should contain: cost, schedule, contract strategy, spiral approach, etc.). Ultimately, we will call on Major Command (MAJCOM) Commanders to commit to the COA that best

addresses warfighter needs. We expect this environment to foster a mutual understanding of what is required, and what is possible.

In January, I further operationalized the program execution end of this collaboration by instituting Capabilities Program Execution Reviews (CPER). The goal here is to provide timely information on program issues so that MAJCOM commanders can make informed decisions. During these CPERS, which will be held twice a year with each MAJCOM, we will identify program execution issues and develop corresponding options. We'll provide a proposed action and relate impacts to the master capabilities as identified in the Capabilities Review and Risk Assessment. The decision to institutionalize the CPER process was the result of positive feedback from last year's pilot sessions with Air Combat and Air Mobility Commands.

A key aspect of the collaborative environment that has already been alluded to is an overall approach to straight talk that I've dubbed, "Expectation Management." With the belief that "surprises" can be kept in check when all stakeholders maintain realistic expectations, I have directed my Program Executive Officers to identify program changes in a timely fashion, no matter what their source, communicate those changes to leadership and then drive new expectations. We can no longer allow changes in funding, requirements, or even schedule without documentation and stakeholder agreement on just what the effects on the program will be. Under the Expectation Management policy, we will no longer "just work it out later." When fact-of-life changes occur, we will honestly assess the impact, document it, and along with all stakeholders, collaboratively agree on a way ahead.

In addition to the operator-acquirer collaboration already discussed, we have also this past year fostered similar collaboration with the test community. Major General William Peck, Commander Air Force Operational Test and Evaluation Center (AFOTEC), and I have jointly

signed out a policy that calls for “Seamless Verification” of our modernization programs.

Seamless Verification is designed to eliminate the seams between contractor, developer, and operational testers. It requires the warfighter, contractor, developer, and operational tester to collaboratively develop test and evaluation activities with the goal to produce efficient schedules and reduce risk of program failure. These requirements are being codified into the test community’s Capabilities Based Test and Evaluation instruction in the same fashion as was done with the acquisition and operational instructions discussed above. The Small Diameter Bomb acquisition will be a pilot program for Seamless Verification

Having turned policy into action, I expect these collaborative environments to produce real results as we execute the task of capability-based acquisition. It won’t by itself develop technology any quicker, but should reduce the risks associated with misunderstanding and unrealistic expectations.

Systems Engineering

Last year, I identified the need to re-instill an adequate systems engineering foundation within the acquisition process. Systems engineering is one of the bedrocks of acquisition management because it ensures that contractor-proposed solutions are consistent with sound engineering principles. It is all the more critical because of the Air Force-adopted spiral development approach to acquisition that incrementally delivers weapon system capability quickly and hedges technology risk. We must have the capability to smoothly proceed from one spiral effort to the next. I implemented a process to ensure Milestone Decision Authorities adequately review the proposed approach to systems engineering prior to approving Acquisition

Strategy Plans. I also demanded that system-engineering performance be linked to contract award fee or incentive fee structures.

To be clear, the system engineering approach used by the AF and our industry partners must focus on an end state that quickly delivers high-quality, best value products (capabilities) that fully meet the warfighters' need, and are designed to easily and inexpensively accommodate growth of capabilities in subsequent increments. In January of this year, I signed out Increment 2 of our new "Revitalizing Air Force and Industry Systems Engineering" policy. The intent of this latest move is to institutionalize key attributes of an acceptable system engineering approach and outcome across the combined AF/Industry enterprise. For example, we have generated appropriate language that should be included into key acquisition documents such as solicitations, award fee plan / incentive fee contracts, and other contracts. I have further directed that this language, which is intended to be an example and not boilerplate, be incorporated into governing acquisition instructions. Our hope is to see meaningful progress within the next 18 months.

Program Stability and Execution

While funding stability is an age-old problem that in many cases is beyond our control, there are measures nonetheless that we have undertaken to improve our ability to manage the instability and also ensure accountability for program execution. One way of better dealing with instability, for example, is through informed decision-making. As I've already discussed, increased collaboration, expectation management, and formal exchanges like the CPER should allow us to collectively make decisions that provide the best use of limited resources, given the

annual ebb and flow of funding profiles. Another way of handling instability more efficiently and credibly is through improved acquisition program management.

I have spent a great deal of time this past year working with the Commander of the Air Force Materiel Command, General Gregory Martin, on a plan to realign and relocate our Air Force Program Element Officers (PEO). I'm very proud to report that this plan, which is designed to clarify lines of responsibility and increase the speed and credibility in acquisition programs, is proceeding on schedule. In October of last year, we took the first major step of Phase 1 of this realignment when the PEO for weapons moved from the Pentagon to Eglin Air Force Base. Major General Robert Chedister, who is also the commander of the Air Armaments Center, is now the PEO, backed up by an acquisition execution deputy. Similar moves were subsequently made for the Aeronautical and Electronic Systems Centers at Wright-Patterson AFB, OH and Hanscom AFB, MA respectively. Phase 1 of this realignment is now complete and the PEOs are responsible for the PEO programs as well as those smaller, previously designated "Designated Acquisition Commander" programs, that have been mapped into their portfolios. There are important details still remaining to be worked, but we've already gained a lot of momentum in the right direction: improved ability to manage limited resources and improved accountability for program execution.

Assisting us in working out these details now is an overarching game plan, or Concept of Operations (CONOPS), that General Martin and I agreed to last December. This CONOPS will govern the acquisition roles and responsibilities between the Office of the Assistant Secretary of the Air Force for Acquisition and the Air Force Materiel Command. The very success of efforts such as the ones already discussed often finds itself in the details, and the agreed-to CONOPS

will go a long way toward fostering the kind of mutual support and can-do effort that will ultimately make Agile Acquisition a success.

Improved Cost Estimating

A final area that I introduced during testimony last year was the problem of faulty cost estimates. I had implemented a policy whereby acquisition programs be designed to a 90% confidence level. Since, we've convened two Integrated Product Teams (IPT) to consider how we might go about achieving that improved confidence level. Within our contracting division, we are considering how better-incentivized contractors might produce more realistic proposals. Also, in conjunction with the Air Force's Financial Management Directorate, the Government Most-Probably Cost IPT also seeks methods to establish and sustain better budgets through incentivized cost estimates. Clearly, in order to improve our credibility with the warfighter and facilitate better investment decisions, we need to produce better cost estimates up front. I look forward to receiving the results and recommendations of these IPTs in the next few months.

Leveraging Science and Technology (S&T) Investment

The Air Force remains committed to an S&T Program that enables us to achieve our vision of becoming an integrated air and space force capable of rapid and decisive global engagement. By continuing our investment in transformational technologies that support a reduced cycle-time, spiral development acquisition process, the Air Force will retain its dominance of air and space in future conflicts, against both traditional and asymmetrical threats. It is a part of the Air Force's proud legacy to be on the cutting edge of technology, and S&T programs have historically been a major contributor to its superior warfighting capability.

During this past year I entered into an agreement with the Commander, Air Force Research Laboratory (AFRL), Major General Paul Nielsen, to improve the timeliness of advanced technology transition from the laboratories into acquisition programs. Similar to the other agreements I've discussed, this one begins with new levels of collaboration and communication. It calls on the AFRL to establish a broad-based initiative to focus and accelerate its technology efforts in support of warfighting capabilities. The initiative includes a capability-based investment strategy, systems engineering, collaborative portfolio reviews, and an annual assessment of the progress and results of this initiative.

Steady investment and rapid transition will support the current preferred acquisition strategy of spiral development. Most, if not all, of the programs to be discussed below, unmanned aerial vehicles, propulsion systems, munitions, aircraft structures and materials, have all been touched by Air Force S&T. Under Agile Acquisition, the goal is to bring these technologies to warfighting success stories faster and more efficiently than ever.

Technology to Warfighting Successes (selected programs)

F/A-22

We are extremely pleased with the progress of the F/A-22 program this past year. With its revolutionary combination of stealth, supercruise (i.e., cruise above 1.5 mach without afterburner), maneuverability, and integrated avionics, the F/A-22 is living up to its promises. The advertised capability is here now--it is no longer just a test program. Our focus is clearly on providing proven capability to the Nation's warfighters soon.

One year ago, we had 16 missile shots completed. Today, after over 5,000 flight test hours there have been 47 successful missile shots (12 guided, 35 separations), and both the flight

envelope and weapons envelope are cleared for Initial Operational Test & Evaluation (IOT&E) start. The program has made tremendous strides improving avionics stability--the issues today are not the same as they were a year ago. Total system reboots no longer occur. The program incorporated full functionality required for operational test and simultaneously improved overall stability more than ten fold. The development program is now nearly complete with all necessary events to proceed into IOT&E; and we now anticipate a full-rate production decision in December 2004.

At this time last year, we had only delivered 3 production aircraft, compared to 13 to date. And while deliveries have lagged, we know much more about the manufacturing processes than we did a year ago. Experience gained with these 13 production Raptors allowed both Air Force and Lockheed-Martin production experts to complete an end-to-end production process proofing and schedule re-baseline in December 2003. The joint government and contractor team addressed leadership, manufacturing processes, tooling, and parts reliability. They identified 171 quality corrective actions, 120 tool improvements, 17 major producibility improvements, and corrective actions for 68 high failure rate parts. The time needed to implement these improvements is built into the re-baselined delivery schedule, and we are about 40% through the implementation plan. As we continue through Lot 2 and Lot 3 final assembly, we will fully realize the benefit of these improvements. We now have a credible schedule, and the Air Force is confident we will recover to schedule before Lot 4 deliveries--December 2005 Initial Operational Capability (IOC) will not be impacted.

In fact, Raptors are now operating in three locations. Ten jets assigned to Edwards Air force Base (AFB) are wrapping up developmental test and are well into operational test. At Nellis AFB, five Raptors are developing operational tactics and techniques. At Tyndall AFB

four jets, and counting, are training pilots today. Additionally, the first operational jet will arrive at Langley AFB in November of this year. Through a year of perseverance and teamwork, IOC is now clearly within visual range, and the Air Force is now postured to deliver this transformational capability as anticipated.

F-35

Acting in concert with the F/A-22 will be the F-35 Joint Strike Fighter (JSF). The F/A-22/F-35 force mix will balance affordability, capability and force structure--critical capabilities for the Global Strike concept of operations--to ensure sufficient quantities of advanced fighter aircraft to give the US dominant force across the full spectrum of conflicts.

Over the past year, the JSF program has experienced some challenges, most notably achieving weight goals, but the government-industry team has taken aggressive measures to ensure program success. In fact, the Conventional Take-off and Landing, and Carrier Variants of the aircraft are still projected to meet all of their Key Performance Parameters, while plans are already in place to ensure success with the Short Take-off and Vertical Landing variant.

In spite of these challenges, the F-35 acquisition program has also achieved several milestones during this past third year of System Development and Demonstration (SDD). These include the Air System Requirements Review, the Integrated Baseline Review, and the Air System Preliminary Design Review. In addition, the program was ahead of schedule for the First Engine To Test milestone, and we have over 200 hours of successful operating time on 2 test engines.

As the Air Force assumes responsibility for execution of the JSF program later this year, it will apply all of the appropriate Agile Acquisition initiatives to effectively address and

overcome weight issues. With all that is riding on the department's largest cooperative development program, we will deliver.

Joint Air-to-Surface Standoff Missile (JASSM)

The Joint Air-to-Surface Standoff Missile (JASSM) is a "kick down the door" type weapon to be used in the early stages of a war to neutralize enemy's defenses and war infrastructure by targeting high value, fixed and relocatable targets. Last year, there was concern among some members about JASSM's performance during test that ultimately resulted in a reduction in fiscal year 2004 production funding and direction to maintain Low Rate Initial Production (LRIP).

Since then, all JASSM test programs, both developmental and initial operational test, have been successfully completed. All issues identified during these tests have been or are being addressed. Furthermore, the Air Force is confident that all fixes have been verified in testing or will be verified with follow-on test. In fact, AFOTEC rated JASSM "Effective and Potentially Suitable," with the major issue affecting suitability being mission planning time. The introduction of a PC-based tool is in work and will reduce the mission planning time and meet requirements. As a result of this past year's success, the Air Force believes all criteria to enter full rate production have been met; however, a final decision will be made after release of the Beyond LRIP report and its subsequent receipt by Congress.

Also of note, last year witnessed the start of a JASSM-Extended Range (ER) program. JASSM-ER is a solid example of the preferred spiral development approach that delivers incremental capability to the warfighter sooner than later. JASSM-ER will increase the range capability to greater than 500 nm without changing the outer mold-line. In fact, with a contract

award in February of this year, Phase 2 is already underway, leading to ground and flight test in fiscal year 2005.

B-2 and Joint Direct Attack Munition (JDAM)

In September of 2000, the Chief of Staff of the Air Force directed the development and integration of a 500 lb JDAM capability on the B-2 Spirit using “Smart” Bomb Rack Assemblies (SBRA). The SBRA program is a key warfighting enabler that improves the B-2’s persistent precision engagement capability. It increases the B-2 guided weapon capability to 80 independently targeted, smart weapons.

Last fall, the Air Force successfully demonstrated the power-up, data transfer, launch, and impact accuracy of 80 independently targeted 500-lb JDAM munitions at the Utah Test and Training Range. In practical terms, this translates into the capability to destroy an enemy airfield in a single pass or attack up to 80 targets on a given sortie. More significantly in light of today’s testimony, is the fact that this program has exceeded performance requirements, is under budget, and on schedule to meet the Air Force Chief of Staff’s “Required Assets in Place” deadline of November 2004.

The JDAM program also reached a milestone of its own recently. During recent operations, JDAMs were being used at rates up to 3000 per month. In order to prevent exhaustion of Air Force inventories, the JDAM program was challenged to increase its production rate from a pre-September 11th rate of approximately 750 per month, all the way to 3000 kits per month. Last month, the JDAM production line achieved a monthly output rate of 3000 units. This happily reflects the determination and effort on the part of our highly successful contractor-government acquisition team and in turn, the principles of Agile Acquisition.

For these sustained efforts, the government-industry JDAM team was recently named winner of the 2004 William J. Perry Award by the Precision Strike Association at its Winter Roundtable meeting and recipient of Aviation Week's 2004 Quality Center Award. The Perry award is presented annually to the public or private sector for outstanding leadership or technical achievements resulting in significant contribution to precision strike systems. The Aviation Week award identifies and celebrates quality, manufacturing excellence, R&D innovation and other best practices in the civil, military and space sections.

Small Diameter Bomb (SDB)

SDB will provide fighter and bomber aircraft with a tactically significant standoff attack capability from outside of point defenses against fixed targets, while increasing loadout and minimizing collateral damage. Last year I reported that the SDB acquisition program was in the middle of a competitive 2-year concept development phase. As promised, that effort culminated in a highly successful down-select decision in September of last year. SDB is now well underway and the program is on schedule to enter LRIP in May 2005.

The program down-select decision and subsequent negotiations provided great-news for the warfighter because the result was a weapon system average unit cost that met warfighter cost goals and an overall acquisition program that is meeting its other requirements. The success of last year's negotiations will allow the Air Force to consider a second developmental spiral of the SDB to provide a moving target attack capability.

Global Hawk

A key enabler to the tactical engagement, Global Hawk utilizes conventional technology operating at altitudes up to 60,000 ft for up to 30 hours to achieve on-demand, long-dwell Intelligence, Surveillance and Reconnaissance coverage of up to 40,000 sq nm per day. During Operations Enduring Freedom (OEF) and Iraqi Freedom (OIF), Global Hawk flew 79 combat sorties and collected over 21,800 images. In OIF, building on lessons learned from its previous deployment, Global Hawk flew 5% of the high-altitude reconnaissance sorties, yet accounted for 55% of the air defense equipment time sensitive targets. It is remarkable warfighting capability for a weapon system that hasn't yet reached IOC. In fact, following extremely successful demonstrations in their two countries, Australia and Germany are entertaining plans to acquire their own Global Hawks.

The Global Hawk program acquisition strategy also exemplifies the preferred spiral development strategy. The successful capability in use today will be subsequently upgraded to include increased payload, a signals intelligence collection capability, and the multi-platform radar technology insertion program (MP-RTIP) for enhanced Ground-Moving Target Indication/Search and Rescue capability (GMTI/SAR).

Predator

First deployed in 1995 for operations over Bosnia, Predator continues to be employed as the most responsive sensor throughout OEF and OIF. We now have over 75,000 flying hours on this system with over 22,000 this past year alone. OIF was Predator's first "networked" operation. By using both in- and out-of-theater control stations with beyond line-of-sight aircraft control, we provided the Combined Forces Air Component Commander (CFACC) additional capability and redundancy to simultaneously control five aircraft over the battlefield, three of

which were controlled via reach-back from the United States. This combined reach-back operation allowed our units to increase their operational flexibility, more efficiently manage manpower, minimize forward footprint, and reduce our high operations tempo. Moreover, of interest to some members, Predator has extended its success this past year by providing tactical imagery directly to ground combat forces and by providing targeting information to AC-130 gunships. As has been noted in previous hearings, this capability can greatly enhance force protection, situational awareness and our ability to rapidly engage targets.

By arming MQ-1 Predator A we now have a very long endurance platform that can find and engage time critical targets. Additionally, we have recently begun enhancing the aircraft to perform better at higher altitudes, increase aircraft endurance, and increase available payload electrical power.

Most noteworthy is our development of the MQ-9 Predator B 'Hunter-Killer' aircraft which will be capable of automatically cueing and prosecuting critical emerging time sensitive targets with a self-contained hard-kill capability to include precision-guided munitions. This will provide a persistent, armed reconnaissance, multi-mission, remotely piloted aircraft (RPA), operating higher and faster than the MQ-1 and with a greatly increased payload capacity.

Conclusion

Over the past year, we in Air Force Acquisition have made great strides in institutionalizing the changes we believe are necessary to achieve the vision of Agile Acquisition: delivering what we promise when we promise. This stems from our ongoing commitment and contributions to the Air Force's core competency of transitioning technology to

warfighting. Given the ever-present need to invest our limited resources efficiently and effectively, we must succeed in our endeavors.

I appreciate the support of this committee and today's opportunity to make part of the record some of the great things that are happening in Air Force Acquisition.

FISCAL YEAR 2005 NATIONAL DEFENSE AUTHORIZATION ACT—THE ARMY'S FUTURE COMBAT SYSTEMS AND THE FY2005 LAND COMPONENT BUDGET REQUEST

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ARMED SERVICES,
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE,
Washington, DC, Thursday, April 1, 2004.

The subcommittee met, pursuant to call, at 1:07 p.m., in room 2118, Rayburn House Office Building, Hon. Curt Weldon (chairman of the subcommittee) presiding.

OPENING STATEMENT OF HON. CURT WELDON, A REPRESENTATIVE FROM PENNSYLVANIA, CHAIRMAN, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

Mr. WELDON. The subcommittee will come to order.

This afternoon the Tactical Air and Land Forces Subcommittee meets to receive testimony on the land component and related programs in the fiscal year 2005 budget request. We have two panels of witnesses.

For the first panel the General Accountability Office (GAO) and the Department of the Army will provide the subcommittee with their views on the Future Combat Systems (FCS) program.

During the second panel, representatives of the Departments of the Army and United States Marine Corps will provide us with testimony on force protection, unfunded requirements associated with equipping our forces and sustainment of the current force into the future.

I have maintained through the years, first as chairman of the Military Research and Development (R&D) Subcommittee, again as chairman of the Military Procurement Subcommittee and now today that the proposed defense budgets have been, and currently are insufficient to adequately fund the programs included in the budget requests.

The GAO concluded in 2003 that the current Army heavy force would be required to remain in the inventory through at least 2020. In order to extend our current capability to 2020, this force would need to be maintained and upgraded.

The funding to support the current force would require significant investment. Our past experience indicates that the current force is constantly shortchanged by ever-escalating cost growth in development programs. Maintaining current equipment is the major challenge.

It is our responsibility to make sure that we do not sacrifice today the capabilities and equipment provided to our soldiers in order to field a capability two decades from now.

The Future Combat System (FCS) is the Army's flagship program of transformation. As envisioned, FCS would allow the Army to rapidly deploy and operate in all types of military operations, ranging from small-scale contingencies to major theater wars.

The technological and organizational advances that FCS promises would keep the Army well ahead of near-peer threats for decades. The FCS program has a number of progressive features.

The "system of systems" architecture within which individual systems will be developed is a dramatic improvement over the past practice of designing separate systems and then making these systems interoperable after the fact.

Another progressive feature is the collaborative environment in which the Army program management, the contractor, and the warfighter community are developing the FCS requirements.

And finally, FCS accounts for lethality, survivability and sustainability as equally important key performance characteristics at the inception of the program.

Unfortunately, however, the Future Combat Systems program also carries very high risks.

The Army has never managed any program the size and complexity of FCS: 18 systems, 32 critical technology areas, 34 million lines of code, 129 trade studies, 157 programs being developed independent of FCS, and all in 5.5 years.

FCS will cost at least \$22 billion through 2009 and \$92 billion through the fielding of the first 15 units of action.

The software task alone is five times larger than that required for the Joint Strike Fighter and 10 times larger than that for the F-22, which after two decades is finally meeting its software requirements.

If FCS experiences the technical difficulties that every major development program seems to experience, the cost overruns will consume the Army's budget.

If Comanche, Crusader, or F-22 are portents of the magnitude of the problems, then FCS R&D could cost \$30 to \$40 billion.

Can DOD or the Army afford such an investment? We do not want to be here in two years rebaselining FCS. Let us consider the long-term and overall DOD budget.

The Congressional Budget Office (CBO) projects an approximate 30 percent shortfall in required funding to execute the long-term defense plan.

Given the overall national fiscal realities, the question is, "How do we reduce the risk in developing FCS so that we can afford to provide funding for the FCS without sacrificing the current force?"

We need FCS to be successful.

I do want to commend the Army for facilitating transparent, proactive congressional oversight on cost, schedule and technical risk from the inception of the program.

We look forward to hearing from our panels about this program of the future and about meeting the needs of our soldiers and marines today as they fight the global war on terror.

Before I turn to my good friend and introduce our two distinguished witnesses, let me just say I chaired the hearing on Tactical Air Forces Acquisition (TACAIR) a week or so ago and the problem is the same: we are in the midst of a massive train wreck.

We did not modernize the 1990's and we have major programs about to come online that we can't fund. That is why Crusader was canceled, and one of the reasons why the Comanche was canceled.

We have three TACAIR programs; we can't even pay for two, let alone three. We have increased needs for missile defense.

It was requested we increase our shipbuilding account; we are currently at 294 ships in the active duty fleet. We are building nine next year as opposed to the past practice of six a year.

The question we have to ask ourselves as Members of this Congress is, "Where is the money going to come from?"

I put the contractors and the services on notice in the TACAIR Subcommittee hearing and I am putting the services and the contractors on notice again today.

We cannot be forced to make illogical decisions because we don't have adequate resources to allocate. You can't do that to us.

You have to help us get these programs under control: costs that are acceptable and realistic so that we can meet the warfighting needs of our soldiers, airmen, sailors, and marines in 20 years, while not overstepping the need for our servicemen and women, currently in Iraq and Afghanistan today.

All of us face the issue of losing our constituents. When I traveled to Iraq one month ago, I met with General Odierno of the 4th Infantry Division outside of Tikrit and we talked about the losses to his troops. And we just had another significant loss yesterday.

He told me the story of a young 24-year-old soldier who was a great American, would be a fantastic leader if he had lived. He was killed doing what he loved to do: defending the ideals of his country and leading his men into war.

He came under heavy attack on the road between Tikrit and Kirkuk and he did what a soldier would as an officer: he led the effort, he was wounded, he kept the effort up, he protected his troops, he protected those around him, civilians, and he was shot again and again and he was killed.

He told about this young American and to me it was an example of why we are all here. And as I listened to his story, I said, "General, that young man's name wasn't Bernstein was it?" And he looked at me and he said, "Well, yes Congressman, it was."

I said, "Well, you see, I am carrying a three-page letter from Lieutenant Bernstein's parents, because I nominated him to West Point."

His parents wrote me a three-page letter telling me what a great man and a great leader he was both in high school and when he went to West Point. And all the stories that came back about him when his funeral was held.

General Odierno read the letter and this huge officer, who was such a capable leader for our country and a great role model, I could see the emotion in his eyes as he looked up at me and he said, "My son went to school with him at West Point."

Fact is that we must do everything we can for the soldier today. We must make sure that they have the best equipment, the best

technology, the best protection. And that is the first priority of our committee, while at the same time, helping to achieve the transformation that is needed for the next 20 years.

The problem we have is, up until now, we can't do both. The Pentagon and our services are presenting us with unrealistic needs. We can't make those decisions as elected officials in a vacuum, you must help us.

So, as we begin this hearing today, I urge our friends in the services and especially in the Army, as we discuss the Future Combat Systems to help us through the tough times that we are going to have to take and decisions we are going to have to make this year about how much to fund, about what rate to fund Future Combat Systems, while also providing the modernization and upgraded protection for the troops that are currently serving America around the world.

We have two panels today. On the first panel, representing the Army is very distinguished Lieutenant General Joseph Yakovac the Military Director, Army Acquisition Corps and representing the Government Accountability Office, Paul Francis, director of Acquisition and Sourcing Management.

Our second panel, testifying on force protection and sustaining a current force will be Lieutenant General Benjamin Griffin, deputy chief of staff, G8, United States Army and Lieutenant General Edward Hanlon, deputy commandant and commander, Marine Corps Combat Development Command.

I want to thank all of you for joining us today. More importantly, I want to thank you for your service to the country.

And before I turn to my good friend and colleague, Neil Abercrombie, I would ask that we observe a moment of silent meditation to pray for those soldiers whose lives were snuffed out in this past week and their heroic actions on behalf of this Nation and free people around the world, in their service to America.

(MOMENT OF SILENCE)

I would now ask my good friend from Hawaii, Mr. Neil Abercrombie, for his opening remarks.

[The prepared statement of Mr. Weldon can be found in the Appendix on page 489.]

STATEMENT OF HON. NEIL ABERCROMBIE, A REPRESENTATIVE FROM HAWAII, RANKING MEMBER, TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

Mr. ABERCROMBIE. Thank you very much, Mr. Chairman.

I want to suggest to the panels and to those who are observing and who will be giving advice and taking information back to the Pentagon and to the various services, that it is very, very important that the remarks of the chairman have close attention paid to them.

I want to make clear for the record that, as the senior Democrat on this subcommittee that I am in full support of the remarks of the chairman and the context and thrust of those remarks.

It is no secret to the chairman, certainly, and it is probably no secret to Members of the panel that my awareness of the Future Combat System comes from General Shinseki, who first discussed with me and that my relationship with General Shinseki was both

professional, in the sense of his representation in the Army to me as a Member of Congress and personal, because of his relationship and his family's relationship to myself, having been born on the island of Kauai and, of course, maintaining his ties there in Hawaii today.

So, I don't see that so much as a conflict, so much as an opportunity to have perhaps even a closer understanding and relationship to the idea of the Future Combat System than I might otherwise have.

The difficulty here is, as I indicated to General Shinseki and since to the chairman and other Members of this subcommittee, is that this system to this point is theoretical. And that is important.

And a clear academic understanding, if you will, of where we want to go is crucial to being able to formulate a rational and reasonable set of legislative policies.

This is an authorizing committee and it sets the base, it sets the direction, it sets the policy and that is our job as stated in the United States Constitution. But as a former academician myself, I also understand that the key is the transition from an academic understanding, or theoretical understanding, to a practical implementation where the consequences can be accounted for.

And in this regard, the chairman has indicated the software question alone, aside from the expense, is an exercise in faith. More than that, it does not necessarily reflect upon the nature of what might be expected in the combat itself.

I have, over the last 14 years, been particularly struck by the presentations that have been made, both in the open session like this and in closed sessions concerning what have come to be termed asymmetrical warfare. And most particularly what the role of the Army and the Marines will be in the context of asymmetrical warfare.

The chairman and I do not agree the political policy matches up with the professional capacity to the Armed Services. I think we maybe a little more work in that regard.

But the plain fact is, is that the Army and the Marines are the ones that are going to and are now facing the consequences of our political actions, whatever their wisdom or lack of it.

And they are engaged and are likely to be engaged in the future for our combat systems in asymmetrical warfare. And whether or not the Future Combat System can be married up with those necessities is what the key is.

I appreciate the chairman giving me a chance to expound on this a little. As he knows and the Members know, I ordinarily don't give much in the way of an opening statement and want to get right to the panels.

But in this instance, I think the chairman has outlined such a crucial and fundamental decision making process that he was engaged in and has articulated clearly what he intends to do. I hope no one misunderstands that he means every word he says and knowing him as I do, he intends to carry through on every word that he articulated.

And I want it formally on the record from this side of the aisle that we will be in support of him, in that regard.

Mr. WELDON. I thank my good friend and colleague, Mr. Abercrombie, for his statement and for his leadership. We do take great pride in this committee and this subcommittee to having a joint response.

I take great pride in all the years I have chaired a subcommittee of the House Armed Services Committee, I have never had a split vote on any issue. And I don't want to have one this year.

But I can tell you the pressures are overwhelming.

We are being forced to make decisions that our military officers should be making, given the budget requirements and resources we have, given the assignments that we are currently involved with, and in many cases, putting us into, not just difficult, impossible positions to try to rectify: modernization with transformation.

And that is what this hearing is all about.

And so with that, I put the pressure on our witnesses to give us the answers. We pay you to be the experts that you are, both in the civilian side, to oversee the programs, from the military side, where we have so much confidence and the most outstanding military ever produced on the face of the earth.

And all of us agree with that.

Though we have competing interests and you simply shove off those decisions to us, it makes it impossible. We want to give you everything you want, but we don't have that luxury of an unlimited budget. And so, you have to help us make those decisions.

With those introductions, I would say that your prepared testimony is accepted without objection for the record. You can say whatever you like verbally and then we will go right to questions.

So, Mr. Francis, if you would start and give us your assessment. And then General Yakovac, we can have you respond and give us your assessment. And hopefully they will be somewhere close together.

I expect they probably won't be, but that is Okay. That is why we have this system.

Mr. Francis.

STATEMENT OF PAUL L. FRANCIS, GAO, DIRECTOR, ACQUISITION AND SOURCING MANAGEMENT, GENERAL ACCOUNTING OFFICE

Mr. FRANCIS. Thank you.

Good afternoon, Mr. Chairman and Members of the subcommittee.

The chairman has set the bar pretty high, I don't know if we can meet expectations here, but I do know we will be talking about the same thing today.

I am pleased to be here to discuss the Future Combat Systems program, also known as FCS. FCS will be the centerpiece in the Army's plan to transform to a lighter, more agile and more capable force.

As requested, in summarizing my prepared statement, I will cover three issues. One: the features of the Future Combat Systems. Two: the prospects for delivering a capable FCS within budgeted schedule and cost. And three: whether alternatives to the current strategy are worth considering.

First: the concept.

FCS is a suite of manned and unmanned ground vehicles, air vehicle sensors, ammunitions that will be synergized in an information network. They are to be a fraction of the weight of current weapons and yet, are planned to be as lethal and survivable.

Their light weight and small size are critical to meeting the other goals of the Army's future force, namely better responsiveness and better sustainability.

At a fundamental level, the FCS will replace mass with superior information; that is, to see and hit the enemy first, rather than to rely on heavy armor to withstand an attack.

Making this leap depends on the ability of the network to collect, process and deliver vast amounts of information, such as imagery and communications, and on the performance of the individual weapons themselves.

This concept has a number of progressive features, which the chairman has alluded to. It provides an architecture, within which individual systems will be designed: an improvement over designing systems and putting them together later.

It includes sustainability as a design characteristic rather than an afterthought. It has galvanized relationships between users and developers and it also shows a willingness on the part of Army leadership not to be bound by tradition.

My second issue relates to the prospects for staying within costs and schedule. FCS, as currently structured, is at significant risk for not delivering required capability within budgeted resources.

In conflict, are the programs' unprecedented technical challenges and time. At a top level, the technical challenges are: development of a first-of-a-kind network; 18 advanced systems; 53 advanced technologies; 157 complimentary systems; and 34 million lines of software code.

From a time standpoint, the FCS strategy only allows 5.5 years between development start and the production decision. This is faster than it normally takes to develop a single major weapons system and the FCS contains several.

Mr. Chairman, you may recall I raised a similar issue when I testified before the subcommittee two weeks ago, when we were discussing the problems with developing unmanned aerial vehicles (UAVs). The FCS program will need to develop two, and possibly, four UAVs in record time.

To meet this timetable, the FCS is proceeding on a highly concurrent strategy. This strategy calls for conducting technology development and system development at the same time and beginning production without sufficient demonstration.

I would like to point out a few aspects of the strategy. Although all critical technology should be mature at the start of development, for the FCS, less than 25 percent of the technologies were mature.

In November 2008, the initial production decision will be made. This will be a year before all the FCS systems, the network and the software will be brought together and demonstrated as a system of systems.

Because production representative prototypes are not planned, production process maturity and system reliability will not have been adequately demonstrated at the production decision.

If all FCS systems are not developed sufficiently, the strategy still calls for going forward with production. Similarly, the strategy calls for accepting existing systems in lieu of actual FCS systems to meet the fielding date.

In our more than 30 years of analyzing weapons systems, we have not found concurrent strategies to work, particularly when advanced technologies are involved.

Delaying the demonstration of knowledge results in problems being discovered late in development. FCS is susceptible to such problems, as the demonstration of multiple technologies, individual systems, the network and the system of systems will all culminate late in development and early production.

This brings me to my third issue, which are alternatives. Alternatives to the current FCS strategy are worth considering, particularly because the tools normally employed to accommodate problems in weapons systems, namely, relaxing requirements and adding money, may not be available to the current FCS program.

The opportunity for making tradeoffs is limited by the fact that the FCS must be as good as the current force at a fraction of the size. Similarly, providing more money after problems have occurred may not be feasible, as the FCS dominates the Army's future budgets.

FCS funding will climb quickly over the next few years. The \$3.2 billion fiscal year 2005 request represents almost double that of 2004.

The total cost of the first increment, which will only equip one-third of the active force is \$92 billion. There is not much headroom in this estimate because it was based on an immature program and because it assumes full success in development.

To put the numbers in context, a modest, one-year delay late in development could cost \$4 billion. A similarly modest 10 percent cost increase could amount to \$9 billion.

If this kind of additional money will be needed for the program, I don't know where it will come from, considering the other significant demands DOD will be attempting to meet at the same time as the chairman mentioned in his opening statement.

Several alternatives to a concurrent strategy are possible if acted upon early.

Alternatives should have several things in common: they should build more knowledge before key commitments are made; they should preserve the advantages of the FCS concept, such as developing an architecture first; and they should have the ability to spin off mature technologies to existing systems.

Alternatives might include: getting a better balance between resources and requirements. One way would be to add more time to the FCS program as it is currently scoped. This would reduce concurrency and risk, but would not necessarily make costs and schedule more predictable.

Another way would be to re-scope the first increment of FCS toward a less-ambitious goal than replacing the current heavy force, if that would be militarily worthwhile.

In addition, the program could be refocused on demonstrating the more critical FCS technologies or capabilities first and then proceeding with the full program.

Regardless of what strategy is chosen for the FCS, it should meet the standards that are the business case expected of an acquisition program. The earlier that decisions on the strategy can be made, the better.

Let me close by saying that General Yakovac, General Shank and their team have worked hard to develop and execute a strategy to meet the program's goals.

They have developed collaborative relationships with users, innovative modeling and simulation methods, as well as an impressive array of management techniques to define requirements and to fuse design efforts.

They have been very open about their risks and the challenges they face. I am encouraged by their efforts so far and hope that decisions can be made early, to give the FCS program a scope and a strategy that can be reasonably executed within expected resources.

Mr. Chairman, that concludes my remarks and I would be glad to answer any questions.

[The prepared statement of Mr. Francis can be found in the Appendix on page 495.]

Mr. WELDON. Thank you.

General Yakovac, it is your opportunity and whatever you would like to say, you are welcome.

STATEMENT OF LT. GEN. JOSEPH L. YAKOVAC, JR., USA, MILITARY DEPUTY AND DIRECTOR, ARMY ACQUISITION CORPS, OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY (ACQUISITION, LOGISTICS AND TECHNOLOGY) DEPARTMENT OF THE ARMY

General YAKOVAC. Mr. Chairman, rather than be a point-counterpoint, I will take a little bit of different tact in my opening remark. But I am prepared to answer questions along the lines that Paul has raised.

Mr. Chairman, distinguished Members of the subcommittee, ladies and gentlemen, thank you for allowing me to update you on the status and progress of the Future Combat System.

In this role I am here before you on behalf of the soldiers and civilians of the Army Acquisition workforce, entrusted with providing our army's material needs from combat systems to soldier uniforms.

Today, our program of focus is FCS: a program with risks, yet full of promise to provide a fully networked system of systems from initial concept through a fully integrated final design.

As we navigate the complexities and challenges of Army transformation and the needs of responding to the global war on terrorism, I want to continue to partner with Congress to make FCS a reality.

With the real-time focus on more than 330,000 deployed soldiers around the world in over 120 countries, it is sometimes difficult, even for myself, to think about the future.

Having said that, we realize that one of our key FCS enablers is open and continuous communications about the need for the program and the challenges it does face.

From the beginning, Congress and the GAO, from my point of view, have been members of the FCS team. Our emphasis on this teamwork enhances how we work together to support the program of record.

We have historically created an information pool relationship; therefore, we began this program with a pledge to partner along the way. We see all stakeholders as partners, not organizations providing oversight.

For example, we have initiated a plan to give your staff unprecedented insight to the FCS program through access to our contractually based earned value management system. We do this to encourage proactive information exchange so you can actively evaluate our progress throughout the program.

Additionally, the more everyone understands the FCS management scheme and program of record, the more comfortable they will become with it.

The complexities and challenges of this program are many, but they are recognized and they are not insurmountable. Through continued open communications and management emphasis on following the key program tenets, we will be successful.

The tenets driven by the government industry team are an innovative way of guiding program decisions.

The tenets are, and these form the basis of the management structure of this program: one, we create opportunities for the best of industry to participate; we are leveraging government technology base to the maximum extent; we associate ongoing enabling activities with the LSI-led activity; we have a very advanced collaborative environment that will overcome some of the issues that have been discussed and presented from design through the lifecycle.

Commonality at the subsystem and component level is the key to how this program has been structured. We design and plan for technology integration and assertion throughout the lifecycle.

We are very concerned and we look very hard at maintaining and shaping the industrial base for today and the future. We will retain competition throughout this process.

We have appropriate government involvement in the entire process. We have consistent and continuous definition of requirements and that is a key to making this within cost and schedule. We maintain, and we will shape the acquisition community that I represent.

At the end, everything we do is to provide an affordable, balanced, performance-sustainable program. It is that balance that is important.

An example how these are used, the tenets, one, three, five, six and number 12 really establish the basis for the relationship between the lead systems integrator (LSI) and the Army. We are a true partner in this complex system of systems, engineering task and in the fielding of a unit of action.

Example number two of how the tenets have guided us maintain and shape the industrial base of the future. It is absolutely critical to the success of this program, perhaps many others, without reshaping our base, we risk losing capability that would be most difficult to replace. Shaping the base is critical and we intend to do so.

In closing, the FCS program is vital to our future as the nation's land combat force and as the Army's top material development program. FCS is an unprecedented military capability for the future. The real winner or loser, if we do it wrong, is the soldier.

We serve the soldier and can ill afford mistakes.

Mr. Chairman and the committee, I look forward to your questions.

[The prepared statement of General Yakovac can be found in the Appendix on page 522.]

Mr. WELDON. Thank you, General, for your testimony, and more importantly, thank you for your service to the country. You have done an admirable job in managing a very large and complex program, which I think all of us up here support.

So the question before us, as I said in the opening, is not whether or not we move into FCS, the question is how we get there at the same time that we have equipment that is being used so aggressively in Iraq and Afghanistan that needs modernizing, needs upgrades.

And how do we balance the two and not have the Army end up with what we had with the Comanche, where after \$6 billion and six realignments of the program, we kill it, when all of us were told that it was the key part of the Army of the future?

So, we want to be your friends and supporters, but we just have a difficult time getting there from here with the dollar amounts that we know that are going to be available.

You have done a good job at the GAO in helping us assess this. You have given us what you call your alternatives; I think you gave us three.

There are some who have said that perhaps, we ought to focus on the system of systems integration of the technology and not necessarily the platform aspect, rather, in some cases, blend it in with what we have in the way of current platforms. I think that might be your second of your three alternatives.

Have you done at the GAO any cost analysis of the difference that would be required? And how perhaps, some of the money currently funding for FCS could be used for some modernization needs?

Have you done that kind of analysis dollar-wise?

Mr. FRANCIS. No, we haven't Mr. Chairman. We have look at alternatives and we talked about them last year. And I think the first order of magnitude is deciding is that possible?

That is, right now the FCS is one big effort that is being brought together as a system of systems and I think a question would be is that the solution, whereas perhaps that is the framework within which the solutions lie.

And I think that is where our first alternative is. Now we haven't gone beyond that to take those apart and see what would the cost differentials be?

Mr. WELDON. Now General, you are here to tell us about the overall program. And obviously, to make the case that FCS needs to be fully funded so that we can complete this transformation and I understand it and agree with it, but what if you were asked if you could perhaps, look at maybe some focus on the integration of

the data systems sets and the software and all that coding work that has to be done.

Is it possible, in your opinion that you can do that and in the end accomplish the same objectives, while also completing the modernization using that technology as soon as possible with existing platforms?

General YAKOVAC. Now let me answer that in two parts.

First of all, the first part as it pertains to FCS then the integration.

The concept of FCS, although people refer it to 18, is really a total integration system of systems. Requirements document as written, puts a premium on such things as commonality, logistics support, et cetera, so that the logistical tale that we have to take toward much less than today.

In order to do that, you have to start from the top; take those requirements and throw them down into those 18.

So, the cornerstone of those 18, as it pertains to that system, are very critical to keep in-step. If you pull out a piece, than you don't meet one of the higher order requirements that I have, such as the staying ability, reducing the logistical footprint, et cetera.

With that being said, the second piece is the technology insertion.

The technologies that we adopted for FCS were already there. We did not put any demand on the system or on the tech base to start something new. We merely looked within the tech base, both government and private, and assessed what we could take and those levels of maturity that would allow us, with acceptable risk, to mature them.

A number of the technologies are software, as you stated. Those technologies, as they mature, can in fact, be inserted, but just like with your home computer, if you don't have the right operating environment, the right processing capability, the right memory, just inserting it into a current force system would not give you the capabilities that you would need.

So then you have to look for those technologies that would be easily insert-able or integrate-able into a current platform.

Those numbers, if you look at the man-ground vehicle piece of it, are very limited because the current architectures of even our most advanced ground systems, the Abrams SEP tank and the Bradley A3 are not capable of easily adding technologies.

Those platforms were designed in the early 1980's; we upgraded them three or four times. There is not much room that you can add technology into them.

Other pieces of FCS, outside of man-ground vehicles, are in fact, being put into the current force and will continue to spiral in. For example, unattended ground sensors; unmanned aerial vehicles; unattended man-ground vehicles.

Those pieces do not need the over-arching architecture of FCS to be into the force, if in fact, they add value to the current force as we look at the capabilities we need to insert.

So, on a case-by-case basis we do intend to look at the capability gaps that are emerging from current operations and take steps to take FCS developing technologies and platforms and insert them where they, in fact, do fill that requirements gap.

That analysis is being done today by the United States Army Training and Doctrine Command. We see some beginnings of that with the Rapid Equipping Force Initiative that we have had today in Iraq.

We have taken some technologies and some capabilities, I hate this talk about technologies more than capabilities; it comes with them, we have put them over there, not in vast numbers, but they are making a difference.

We are improving the ability of the soldiers on the ground to gather information more rapidly and disseminate it.

And so, in those areas where we have a capabilities gap, where a technology can then be put into that, to give a capability, we intend to do that.

Mr. WELDON. Thank you, General.

One final, quick question before I let my colleagues question, because we want to get through everyone to ask questions.

The initial operating capability (IOC) is 2011. Is that correct?

General YAKOVAC. Correct. Yes.

Let me explain that, if I may, rather than answering yes or no.

A year ago, when the FCS was brought over here, if you all remember, we had a very ambitious 2008. That was an entire unit of action, as it was defined. That was everything.

Between March and April and May of last year, the Army reassessed, both in terms of when it can afford and the account of their risk that we knew we had as we emerged out of the first phase of FCS. We had documented risk and we knew it.

So, in that timeframe, we did two things. First of all, we stepped back in the initial phase of the program. We slowed it down by a full two years. And that was to do the system-less systems integration [that the GAO talked about] to focus on it.

To make sure that we had everything that we needed to have in terms of engineering, sound engineering practices, to include software documented so we can move forward and still meet the schedule.

The second thing we did was recognizing because of costs, and we have made adjustments from the original program, we looked at 2010 as defined at that time, 31 December, so yes, 2011 calendar year.

Well, rather than having a full unit of action, that is everything that we thought we could have, we slowed it down and we are going to insert a piece of a unit of action into a current formation.

And then over time we will evolve it to a full unit of action, which we will go into an operational test in 2012, and not make a final determination on full rate production until 2013.

So, that 2 years from 2008, really meant not 2008 to 2010, but really meant 2008 to 2012 and the insertion of those technologies into a current formation, when we begin to look at how we fight together, because as was stated together, we will have the current formation in the force for quite a long time.

So, we don't intend to overnight to go from a current Army with its capabilities, into the future. We will evolve into it because of obviously, the consideration of technical risk, affordability was a big aspect of it and all of the other pressures that the Army has on it to focus just on modernization.

Mr. WELDON. Mr. Abercrombie?

Mr. ABERCROMBIE. Thank you, Mr. Chairman.

Mr. Francis, forgive me, on this, what I am going to start asking you is not meant to embarrass or put you in an awkward position, but what you have put forward here and you are very thorough.

By the way, I want to compliment you, you think I am coming after you now, your report is extraordinarily well-written, very clear, which enables me to ask the questions, I hope, that I am going to be asking.

Do you have a background in the Army, in terms of doctrine, in terms of strategy, in terms of historical understanding of warfare, theoretical and otherwise?

Mr. FRANCIS. No, Mr. Abercrombie.

My background has been basically in weapons acquisition for about 25 years.

Mr. ABERCROMBIE. The nuts and bolts of it?

Mr. FRANCIS. The nuts and bolts of it. Yes.

Mr. ABERCROMBIE. Okay. The reason I asked that, as I said, believe me, it is not to embarrass you at all. If anything, it is to create a foundation of comments about my questioning and why I am doing it.

I have not served in combat; I was not in the military. That makes me like a lot of other people in the country. Nonetheless, I have legislative responsibilities in this regard on this committee, and this is my 14th year on it.

What I have tried to do then, in preparation for this, is I read and try to immerse myself as much as I can in history, doctrine, strategy, try to understand what it was that helped make decisions.

Because the overt history, if you will, of combat itself, as far as I have been able to determine, all has as its foundation what people thought was going to happen and what they thought needed to be done.

Now, in that context, and in the area of critical technology areas and they are, if I am not mistaken, 50-plus individual technologies associated with it.

Is that fair?

Mr. FRANCIS. Yes, sir.

Mr. ABERCROMBIE. Okay.

Just to zero in on one, I am going to refer you to page six and seven and eight of your testimony because I think the general has already zeroed in on what I was going to try and do, which is focus on a unit of action.

And this blends into the second panel.

Forgive me for all my preliminaries, I can't do this any other way and make sense to myself, and hopefully the rest of the subcommittee.

When Chairman Hunter took us to Iraq, virtually at the end of the initial attack, it is no secret to people in here that I have always viewed this activity, this military action as an attack on Iraq, a lightning attack on Baghdad to be followed by a war. I never considered the initial thrust into Iraq as the war.

But I thought it was going to cause a way and then that would happen afterwards. And what I thought at the time, and what I

said to the chairman and what I said to Mr. Weldon and others at the time was, "We drove from the airport in Baghdad. Now they have to have helicopters."

And the reason, when we drove in I said, "Look, from what I understand from all my reading, taking a look here, this is a strip of tar in the desert."

And you don't have to go back further than seven pillars of wisdom, or revolt in the desert to see what happens when you have a fixed strip for transportation and no protection on every side. There was no light, there was no anything.

I said in order to prevent mines being put in the road or explosive devices, on or near the road or in vehicles or so, which we saw burned out on the side. I said, "You are going to have to have thousands of soldiers just to guard this. Otherwise, you are going to be taking extraordinary chances, unless the vehicles that will be passing down this road have four characteristics: lethality, survivability, responsiveness and sustainability, which you have outlined."

I didn't say it as clearly as that, but it was my understanding from all of the reading and all of the work we have done. And we were assigned work by the chairman, I can assure you. If you want to be in his company, you have to do it.

And I didn't think we were going to be ready for that and I didn't think we were prepared to do that.

So, this is asymmetrical warfare. And precisely the kind of thing I thought we were getting into and the traditional decisions, or the traditional ways of saying what a war was all about and how you win or lose was not going to apply.

So, my question, Mr. Francis, is and I guess, generally, you would have to answer it at the same time. You are at a little bit of a disadvantage, Mr. Francis, because we have had classified briefings in this area that you may not have been privileged to, in terms of information.

But you, nonetheless, signed at the bottom of page seven. For example, the FCS vehicle's small size and lighter weight are factors to improve agility, responsiveness and deployability, however, lighter weight precludes the use traditional means to achieve survivability, heavy armor.

The FCS program must use cutting edge technology to develop systems such as an Active Protection System to achieve survivability.

I think we have a case in point. Would you agree, General, with what we are dealing with right now? If not, on the Baghdad road from the airport in Iraq and Afghanistan, too.

So, my question is, is that given the constrictions that the chairman has outlined, and just using this as an example of the 51. How are we going to do what we said we were going to do? How are we actually going to accomplish that legislatively?

If we have to extend this system out, I think we have to know now. I am not going to get mad about it. It is not going to irritate me to 2008 has to be changed or something of that nature.

Or do we have to draw down on the number of changes we are going to make in this system, in order to address the real question, which to me is a doctrinal one. What is our object and how are we

going to accomplish that object with the people and the equipment that we have?

Should we take what we have and work with what we have and leave some of this software futuristic, technological razzle dazzle to itself. And perfect our training and our utilization of the equipment that we have, rather than try to meet an unrealistic date for exotic technology.

Mr. FRANCIS. Mr. Abercrombie, I think one way you have to look at FCS is it is being offered as a full spectrum system.

Mr. ABERCROMBIE. I understand.

Mr. FRANCIS. So, it will have to take care of everything: just like Iraq and heavy armor. To do that, it needs all of those technologies.

So, the way I would look at it is the FCS really is it is a revolutionary acquisition. And because it has a very high bar to meet; it has to do everything the heavy force does very well today and everything the light forces are supposed to do.

To get that job done, then, if the technologies were there, to put together systems, they had to take immature technologies out of the science and technology base and include them in the design to give them those capabilities.

So, the way we look at it is, it is a very ambitious acquisition from a mission's standpoint. It has immature technologies, it has a very tight schedule, and it has, I think at this point, an optimistic cost estimate. I don't know where the wiggle room, if you will, for managers to manage inside that box.

Mr. ABERCROMBIE. If that is the case then, Mr. Francis, and I accept that.

Shouldn't we go back to principles then and redo our doctrine?

Mr. FRANCIS. Well, I think the question would be if this is what it takes for that type of solution, then I think you say, "That could be a very costly solution and we may not get it when we want it anyway, because technologies have a nasty habit of not behaving and not being insistent on a schedule."

Mr. ABERCROMBIE. That is right: the psychology of machines.

Mr. FRANCIS. Yes.

Mr. ABERCROMBIE. That is what Norman Mailer says.

Mr. FRANCIS. So, I think then you say, "If that is the ideal solution"

And I wouldn't disagree with General Yakovac that that would be an ideal. If we can't get there, then we have to think about what solutions would work, and that is where we get into the discussion—

Mr. ABERCROMBIE. Can you indulge me 30 more seconds?

General Yakovac, then that brings me to this. Will you agree with me or disagree with me on my approach to this? I am doing the best I could.

General YAKOVAC. Oh, no, I like the dialog.

Mr. ABERCROMBIE. I am not a combat soldier.

General YAKOVAC. I understand.

Mr. ABERCROMBIE. But I am not a fool.

General YAKOVAC. Yes.

Mr. ABERCROMBIE. And I take, as every Member does here, extraordinarily seriously the point that the votes we make affect the life and death situation of you and the troops under your command.

So, given that, if this is the case, I understand we have to modernize and all the rest of it, but maybe modernization means that we have to redo the doctrine.

Maybe we have to modernize our doctrine as well and start matching up what we have and who we have to what they face; what those vehicles and technologies that we do have are facing.

When you are on the road from the Baghdad Airport into Baghdad, there are a series of things you are going to have to face.

For example, donkey carts with mortars on them. Speaking of modernization, what the hell difference does that matter to me? That means people are utilizing what they have. I am talking about the opposition here.

I have to be cold-hearted about it in that regard, is that those in opposition, what do they have? They don't have Stryker Brigade Combat Team. They don't have an Abrams tank.

They have donkeys and they have carts and they have a mortar system, so they drag it up and they try and blow up a hotel. To me, that is making maximum use of what they have, which is good military doctrine.

General YAKOVAC. Right.

Mr. ABERCROMBIE. Now, I would prefer to say to the chairman that I can support maximizing the capacity to utilize our current technology to its fullest extent in terms of lethality, survivability, responsiveness and sustainability, and maximize the training and the indoctrination of the troops with regard to how they can use those vehicles in the circumstances they are most likely to face, rather than deal with the theoretical, and perhaps the impractical, in terms of exotic technological advance.

General YAKOVAC. I will answer that in two ways.

First of all: to discuss the doctrinal piece. You are absolutely right. The way we—

Mr. ABERCROMBIE. Could you repeat that just because it is so good.

General YAKOVAC. To look at the doctrinal piece, you are absolutely right.

The material piece is the one that people get enamored with, because it has the dollars.

Mr. ABERCROMBIE. Exactly.

General YAKOVAC. But you don't want to go to material if you can do doctrine, and we don't.

So part of the evolution from today, and the lessons learned, we have already changed tactics, techniques and procedures (TTP) within the Area of Responsibility (AOR) to account for what we could do by doctrine.

We do convoys differently today. The material solution then enables that doctrine to grow.

So once you determine you have a doctrinal change that you can implement, that turns into a new tactic, technique or procedure to overcome what you discuss, then the next phase of it is to look at the material solution that then allows you to get to the point where you can continue to grow the doctrine and the TTP to be much better.

I will pick one area, and that is survivability. Survivability has many facets.

The survivability of the systems that we have today were primarily based upon the Cold War scenario of a frontal, known threat. There is not a vehicle that we have in the inventory that is not susceptible to the type of threats that you have talked about.

For example: large blasts; 360-degree survivability, because the design parameter was in the frontal 60-degree arc. So, if you take that lesson learned, what can you do in terms of both rapid materiel and also tactics, techniques and procedures?

We have done that. We have continually fed back from the AOR to a group of officers and enlisted soldiers—

Mr. ABERCROMBIE. Excuse me, general. I am listening.

I know that the chairman is going to tell us we have to leave in about two minutes because of the vote and we will come back.

General YAKOVAC. Okay.

Mr. ABERCROMBIE. But I accept everything that you are saying there, but are you making the case, or can a case be argued to you then, that then we have just done about as much as we can and should and are likely to have to deal with, say, for the next 10 years or whatever it is?

And so therefore, there is not a necessity to pursue this exotic technology in terms of funding?

General YAKOVAC. When you come back, I will talk about the other aspect of what you just asked, and that is what you can do with technology in this situation, which we have done some of it, but this expands upon it.

I will answer that.

Mr. WELDON. Will the gentleman yield for that?

We apologize for this break to vote, but if you would hold that thought, when we come back we will recognize you to complete it. And the gentleman from South Carolina has questions.

Hopefully, other Members will be back here. So we will stand in recess until this one vote is over.

Thank you.

[Recess.]

Mr. WELDON. I am waiting for Mr. Abercrombie because he asked the question.

So, if you bear with us for a minute or two. He must be a little slow today coming back. We are going to have to send a staffer over to get him.

[Recess.]

Mr. WELDON. The subcommittee will come to order.

Gentlemen, if you don't mind, since Mr. Abercrombie is not here yet and I want to pick up on where he left off, I am going to ask Mr. Schrock to ask his questions, if you don't mind.

General YAKOVAC. Okay.

Mr. WELDON. And then we will go back to Mr. Abercrombie to finish, General Yakovac.

Mr. SCHROCK. I figured I better get here early, because if Neil beat me, I would never be able to talk.

Mr. WELDON. The floor is yours, Ed.

Mr. SCHROCK. First of all, let me thank both of you for coming here today to give us some insight on these matters.

I believe the goals behind the Army's FCS development plan is very worthy: leveraging the ability to gather and process a superior

amount of information for increased lethality and survivability is a practice that should be the hallmark of our modern military.

And I think the rapid pace and low casualties of the 3rd Infantry Division (ID) in their drive to Iraq can in part be attributed to their effective use of the latest combat command and control systems that allowed General Buford Blount to stay one step ahead of the threat.

At the same time, that such a large number of systems you are simultaneously developing are immature, and our role as an oversight authority of this committee cannot help but watch anxiously for program delays and cost overruns that have been typical in the similar ambitious programs in the past.

I strongly urge you to be very careful in not just keeping this program on track, but in properly communicating with this committee in setting expectations, because there is no one who will support you more than the man sitting behind me, I can assure you.

I am sure that there will be many critics along the way. That is to be expected. I hope that their insights will prove useful in refining your program and communicating your intentions.

We owe it to your soldiers to provide the best equipment when we send them into harm's way, and we owe it to the taxpayers to develop that equipment as efficiently as possible.

That being said, let me ask, and if I am not mistaken, the FCS system I think has been on the drawing board since 2000, I believe, unless I had that wrong.

But given that the Army has begun, what I think is commonly accepted to be a very fundamental transformation and reorganization in the last year, will the future FCS program goals and objectives have to be adjusted to accommodate the new structure of the Army, which we feel assured is coming down the pike.

General.

General YAKOVAC. I think, in fact, it is better. I can better answer this question now than I could a year ago.

As you know, when the Chief came in, he started having Army look at modular units. I am happy to say that the design of the armored modular unit, which the 3rd I.D. will go to this summer, reflects the movement toward an FCS unit of action in structure.

And so the Army looked at where it wanted to be, and then looked at modularity, and looked at what we thought the goodness of this design was out here. And in the design, not in functionality, have brought that forward.

And so, now you have a direct path, in terms of structure, from the modular brigade to an FCS unit of action, to include functionality.

The difference is in capability, because the technologies are not all here in that structure, but a very similar structure that takes you on the road to an FCS-equipped unit of action in terms of organization.

Mr. SCHROCK. I think your Chief is right on board with that.

I wore the Navy uniform for 24 years, but I can tell you, I am incredibly impressed with your new Chief. He talked to us the first time and somebody said, "What are you going to do with the bad guys in Iraq?"

And he said, "We are going to find them and kill the bastards." I thought, "I love this guy already." Wonderful guy, so I think some good things are going to happen.

Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentleman.

We will now—

General YAKOVAC. We back to the other question?

Mr. WELDON. We will go back to the illustrious Mr. Abercrombie.

General YAKOVAC. Okay.

Mr. WELDON. And we will allow you to answer his question.

General YAKOVAC. Let me think where I left off.

First of all, if I haven't, I am going to go back and answer the doctrine TTP issue, which—

Mr. ABERCROMBIE. Oh, I understand that.

General YAKOVAC. The second piece I would like to take on is this whole idea of asymmetric warfare and the issue of survivability.

In the asymmetric fight, what you don't want to rely on is what I would refer to as inherent survivability. That is how much armor plate you have, what in testing you know you can defeat, because there is nothing out there that we can defeat entirely at 360 degrees.

There is always something that will penetrate.

The key in the asymmetric is information. You don't want to put yourself in the position where you are reacting and relying on your inherent armored capability. You don't want to go into that fight.

So, if you look at the construct and some of the rapid-equip things we have done already in Iraq, it is based on information.

For example, if I fly that route with a UAV with advanced sensors and with software that will detect change, I fly it, I fly it, and I look for changes.

The key here is fusion of that information so that I don't have to have a man sit there for an hour or two and look for the change. Can I create software that will allow us to look at patterns and pick it up?

So that convoy, if it is in fact tied information-wise, moving down that road that you talked about, and a change has occurred, rather than being reactive, we can be proactive in how we approach that danger point.

And so, if you look at what we are doing in FCS, as an architecture, the key is information and networking, so that everybody can have access to it and then proactively take the proper TTP to negate what that asymmetric force has done.

You want to be able to do it at standoff, not when you are in the vicinity.

So, again, it is this integration of sensors and network. That is not peculiar to FCS. What FCS does is take it to the next level in terms of networking.

That does not mean that along the path to FCS that the integration of sensors and software, and better algorithms, in terms of those sensors, cannot be introduced into the current sensor fleet we have.

That is probably one of the easier technology insertions that I can think of.

And so, that asymmetric information, which greatly enhances inherent survivability, because unless I build a pillbox and make the walls X-thick, 360-degrees around, I could never guarantee you the protection that we want soldiers to have.

So, it is that integration of inherent and information, and in some cases the technologies that if you are wrong, you still don't get into the close fight. You can stand off, you can use that information to negate that.

And that is part of the path we are on, but it is not peculiar just to FCS. It is just that FCS carries some technology maturation with it that were there before we ever started FCS as a technology.

But we are wrapping our arms around and trying to mature it. If it matures, there is no reason why you can't insert it. The only thing that would stop you from inserting is what is the cost of that insertion.

Mr. ABERCROMBIE. I appreciate that and I thank you.

And just by way of comment back or response, I notice that you are emphasizing the Future Combat System with the emphasis on combat.

Asymmetrical to me also carries a very heavy doctrinal burden with respect to occupation, or post-combat operations.

If you are an operational combat, which I think maybe we can address better for purposes of the committee now in the second panel, because I think you have an entirely different necessity to face.

General YAKOVAC. Let me get one step further though, and part of that is, in fact, embedded in this full-spectrum force, this thought of asymmetric.

Today, if I am a dismounted soldier away from my vehicle, I really have no connectivity probably other than voice or hand and arm signals, or maybe a radio.

If I could make every soldier a node on the network throughout that battle space, I now have increased his survivability dramatically, because I have given him more information and the ability for somebody else to help him with his situational awareness.

And so, part of FCS and part of Land Warrior, which ends up moving into FCS, which we are going to introduce Land Warrior earlier into Stryker, but as it evolves, it will begin to give that soldier the same situational awareness in combat as he now has in the vehicle, off the vehicle, and a responsive way to react.

So the same analogy applies. His inherent survivability is what he wears: his interceptor body armor, his vest.

If I can get him away from having to use that through information, and everybody on the battle space has that, again, I begin to negate some of the strengths of an asymmetric force.

Mr. ABERCROMBIE. I agree with all of that, and I understand the theory of it, as well as how it would work if it worked.

My problem is, is that I am a troglodyte, essentially, when it comes to technology. I believe that if it is possible not to work, it works very hard at not working.

Mr. WELDON. I thank the distinguished gentlemen.

And would you explain to us what the symbolism is? People have asked me during the break in the hearing.

Mr. ABERCROMBIE. This is an expression of deep love and affection for my constituents.

Mr. WELDON. All right. As long as it is not keeping love and affection from me, I am happy.

Mr. Spratt is recognized.

Mr. SPRATT. General Yakovac, I commend you for your boldness, but I have to say, I can't recall seeing in the 22 years I have sat here a system fraught with more risk. It is going to be a herculean task to bring it together on the ambitious schedule you have set for yourself.

Did I understand the gentlemen, Mr. Francis from GAO to say that \$92 billion will be needed, I guess current year nominal dollars, will be needed to outfit a third of your brigade combat teams to assist kind of—

General YAKOVAC. Fifteen brigade equivalents, yes. And then year dollars.

Mr. SPRATT. Is that the program requirement? Are you doing the whole Army, or just a third of your brigades?

General YAKOVAC. Right now the program of record is what the GAO discussed.

What will the Army look like in 2025, and a mix between current force and an FCS unit of action? I can't sit here and tell you that I know the answer to that question.

As we go forth and we balance, as was stated before, our resourcing requirements and an uncertain world, things will change that we have committed to 15 units of action, which are modular, so, if you compare that to what the chief would like to get to 48 units of action, however, they are not all of the same construct.

So, where the Chief is taking us today is a bit different from a year ago. And I can't sit here and tell you that every unit of action, FCS-equipped, will replace every unit of action brigade as he now envisions modularity. But the program of record is 15.

Mr. SPRATT. Each unit of action is about \$9 billion procurement cost, plus some allocation of R&D?

General YAKOVAC. Yes, sir. But that takes into account systems that people have referred to as complementary, that would be there even if we didn't have FCS.

For example, precision munitions such as Excalibur, a precision munition for mortars. Those were there on the drawing board long before FCS and had fielding dates about when FCS was coming in. So, all we did was marry those up.

And so, if you look at an FCS-equipped unit of action, that is where that number comes from. It is not just the 18 things we are developing under the FCS program of record, it is the other complementary pieces that were there.

I can't think of one complementary system that we brought along as a result of FCS. They were there, and then we moved them in to fully integrate those capabilities into the FCS architecture.

Mr. SPRATT. Well, given the effectiveness to this system, its efficiency and effectiveness, efficacy on the battlefield, will there be savings? Will we be saving systems that you want? Will this give you greater lethality and greater maneuverability at less cost, eventually?

General YAKOVAC. Yes, sir.

Mr. SPRATT. Will it obviate the need for some—

General YAKOVAC. Especially, and, again, I will put this in the context of less cost.

My basic branch is infantry. When I came in as an infantryman, I was a chief instrument of war. I had recoilless rifles, 90-millimeter, 106s and I carried them on Humvees, 1-1-3s, et cetera.

I look at the same lieutenant that I was, today, in a mechanized unit, and I have replaced recoilless rifles with Javelins, I have replaced 1-1-3s with Bradley Fighting Vehicles.

And so, that desire to continue to improve the capability of our young men and women to fight and return home has driven us to now a tip of a spear that is what we are asking them to do, and what we want to provide them, is more expensive than the tip of the spear used to be.

Now, that being said, where you get the savings: as we continue to move down that spectrum of that tip in increased costs, we were designing individual programs with individual logistical tails, with individual components that were in a Bradley A3, a processor that is different in a tank, so, the supply chain that you have to have behind you is large.

Through commonality across the design; through sharing of even sensor technologies in the future, you are getting at the biggest cost driver, and that is operational and support costs.

The problem is that how do you garner that if out here? And I can't bring it forward, I wish I could, but we can't. And so, that is what we are after.

Does it cost more? Is the unit production capability absolutely because of the technologies? Will it cost more over time? The contention is no, because we are taking advantage of technology and commonality, prognostics, diagnostics and information.

So the same thing that you enjoy in your car today is have a very reliable system that is responsive and easy to maintain. So it is out here. It is not upfront, unfortunately.

Mr. SPRATT. Mr. Francis says if you have a one-year slip in schedule, which is not at all untypical for a DOD system, it could cost easily \$4 to \$5 billion more. Would you agree with that?

General YAKOVAC. No, sir.

Right now, if you would look at the way this program is structured between now and 2008, we have taken into account the decisions that will allow us what we call off-ramps.

So, if we have a capability that we want and we assess it, and either because of cost or schedule; we have a very close relationship with TRADOC, who is part of this team, to say, "Look, we can give you this or we can give you this. Is this acceptable right now, because from the overall Army standpoint it is going to cost a lot more money?"

In fact, in the last year, we have already made some of those trades. We have made trades to look at not only performance, but affordability and integration, cost and meeting the timelines.

And we are in the process of continuing to make those trades.

For example, if you would look into the FCS unit of action, we have four unmanned aerial vehicles. In our acquisition strategy, we

went out and requested from industry to be honest about what they could do in the timeline we laid out.

We had quite a few bids on the high end of the class-four UAV, the largest UAV. The one that we chose, because we balanced cost, schedule and performance, is one that is already in production and we have now teamed with the Navy to bring that in together. I am now leveraging another service's costs, which I like to do.

But we are going to have a bird at the end that is common. And that was a conscious decision that we did as we went out and we looked for things to bring into this.

So, if we could make and continue the discipline of making the right decision at the right time, we could negate that large requirement for increased resources.

Now, will I argue with you that history has proven me wrong? Absolutely.

But if we know that is what we have to do in this constrained environment, and my leadership is in concert with that, we have definite decisions to make in the next year that will influence the cost and schedule of this program and performance.

And I believe the Army is willing to make the tough choice, because we understand the resource constraints we have.

Mr. SPRATT. Let me ask you this: is the lead system integrator reliable to the Army, to the Department of Defense for timely performance for scheduled specs, with respect to all of the subcontractors or all of the component manufacturers?

General YAKOVAC. Absolutely. We brought in a lead systems integrator because of the complexity of this program.

And the contract for the development phase is through them, working with us, a much different construct than anything that we have ever put together before. It is not a cookie cutter lead systems integrator approach.

But to answer your question specifically, "Yes." It flows down that requirement to deliver us, not a piece part but an effective unit FCS-equipped unit of action. That piece, which is FCS—

Mr. SPRATT. The question I am asking is, if there is a slippage of, say, a year or two years, and if there is an identifiable cost of \$1 billion or \$2 billion, is the lead system integrator responsible for that additional cost?

General YAKOVAC. No. And let me tell you why.

Historically, most of the times, we have a program of record that says we share the risk in determining those requirements that we want to meet. We also share the risk of laying out the timeline. We do that. Then we go to industry and we partner with them. It says "Based on these constraints, work with us." If they had the ability and they have influenced our design time—for example, last year, when we collectively looked at the schedule, we stretched it.

Because with our partners, we sat down and we said, "We can't do it." And they said, "You are right; we can."

Now, if they weren't part of this, they could have said, "Yes, we could do it." Because they know they don't have to pay. But I believe in this case, they are very, very conscious off what the army has at stake.

They are very conscious of what we are doing today as we fight the war, but we can't afford to do something that would allow that to happen.

So, to answer your question, "No. I don't know how to do that, because so many factors they don't control" as we go into this. But in those areas where they do, and they are committed to us, as a team, to help us make the right decision.

Because they know that if this goes away, we don't have any other major modernization program. And as a representative of all of the industries that were brought together, I think we have now the timing and the commitment to try to do things right.

Now, tall order, a lot of things have to happen, but knowing that, I think that is how you get around that, to answer your question. Mr. SPRATT. One final request; my time is way past out.

Could you submit for the record the Army plan for program management metrics that you referred to in your testimony?

General YAKOVAC. Absolutely.

Mr. SPRATT. Thank you very much.

Mr. WELDON. Thank the gentlemen.

Dr. Gingrey is recognized.

Dr. GINGREY. Thank you, Mr. Chairman.

Gentlemen, Mr. Francis, General Yakovac, thank you.

Thank you for taking time out of your busy schedule to come and speak about this important issue, and, of course, thank you for your service.

General Yakovac, I am particularly interested in how the implementation of the Future Combat System over time will change the way that the Army trains and equips its soldiers, and I am thinking particularly of the infantry.

And I represent Fort Benning down in Columbus, Georgia, and if you could just elaborate on how the Army will generally have to adapt their training to implement this program, I would appreciate it.

General YAKOVAC. Yes, sir. One of the things that we have done over the years, a good analogy when I was a lieutenant: I would go out to a range and everything I did was live. I mean, I fired a weapon. I had to do it.

The one big change is, over the years, we have begun to adapt to other ways to train, using simulations, using the integration of modeling and simulation with real.

The FCS is the next logical extension of that training philosophy. To get back to the issue of the cost to the Army: live training is expensive. If you have to shoot a lot of live bullets to maintain your proficiency, if you have to go out and do large maneuvers, it is expensive.

Part of the FCS construct is a focus on training differently and growing leaders with a more of a blend of live and this idea of simulation and virtual.

For example, embedded in each combat system, which is not today's way of doing business, are all the tools you need to become a proficient gunner.

Today, we have an off-board device called the conduct-of-trainer (COFT) for Abrams and Bradley. You have to go somewhere; it costs about \$1 million apiece, maintained under contract, for you

to maintain your proficiency while you are not in the vehicle or out training with it.

And this is followed up by an extensive period of live gunnery.

You can never get away from live gunnery, because you need to do that, to feel the jolt that you get in the recoil and all the other things that happens inside the combat system. But you can maintain proficiency in the concept of FCS by just going and taking your own crew.

If you are a sergeant, take your crew with you, go down to the motor pool, turn on the vehicle, and go into the training mode.

The training mode will put you in a virtual environment, as if you were out there somewhere, with a panoramic view coming in. You can actually learn how to fight your system and never leave the motor pool.

And so if you can shrink that training time and that proficiency, that allows more time for soldiers and their families. It allows them for more schooling. It really changes the way you do business.

And so embedded in this is that concept of being able to train individually through collective tasks by the construct of that. The next level up would be: I am a platoon leader, I am a company commander. I want my folks to come together and learn how to command and control.

I will go down to the motor pool, go to the training mode, turn on the network. The network will be robust enough for them to train as if they were really at the NTC. But they will be in their own motor pool.

So, that is the next logical extension of what we have started today. We have some of that today, but it is normally in a fixed facility. It is not in the system of record.

And that will greatly enhance the training. Also, the interface between the dismounted infantryman and the vehicle: the same thing. If I want to tether that person via Land Warrior and information, I can do the same thing with that.

For example, rather than going out to a range with software, I can give a soldier a sight and the software can bring up a picture that makes it appear as if it is really on the ground. And I can begin to see targets and train them on things before I ever go out and fire a real bullet, which costs money.

So, it is that revolution in training that is inherent in this networking and in this basic design of all the systems that we are after. But it is just the next evolution, it is not revolution. We had that today in stand-alone trainers, and what it allows us today is the processing power we could put inside of a vehicle, which we couldn't do before.

So I hope that answers your question.

Dr. GINGREY. General, that is an excellent explanation. It does answer my question.

I thought I heard maybe, Mr. Francis, you may have said earlier, or someone, that this wasn't an evolutionary change, it was a revolutionary change. Did I hear one of the witnesses say that?

Mr. FRANCIS. Yes, I said that. Yes, and I was referring to the totality.

That is, to meet the combat requirement, that is, to have the Future Combat System perform the full spectrum of activities, say,

from peacekeeping to all the way up to duking it out with armed vehicles. That takes in total a revolutionary advance in capabilities.

Dr. GINGREY. So there is no disagreement between the two of you on that. Thank you.

Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentlemen.

The gentlemen, Mr. Akin, is recognized.

Mr. AKIN. Thank you, Mr. Chairman. Start with a couple of questions here.

First of all, given the advances in technology which lead to designing and acquiring increasingly complex weapons systems, program managements become very challenging.

Is that the reason the decision was made to go with an innovative means of meeting the management challenge for your Future Combat Systems program that you chose to select a lead systems integrator for the program instead of remaining with the traditional Defense Department method or management process?

General YAKOVAC. The answer to your question, simply, is yes. I have been in this business now, when the Army chose me to go to it from infantry, for about 13 years. I have managed the Abrams, Bradley, and I was the manager of record of Stryker.

Dealing with Abrams and Bradley in retrospect as I went to Stryker was relatively easy. I had a set platform, I had a set piece of requirements that was focused on, A, capability.

Going to Stryker, excuse me, increased the complexity of integration across the entire battle space.

And so in order to do that effectively, in Stryker, because of the fact that those were already components that we had, by and large, then I can go out to sister PMs and PEOs and say, "I need you to be part of my team to integrate this item onto this new vehicle."

The integration was relatively simple. We merely took the network of record and put it into the vehicle: relatively simple integration.

What FCS requires is a different level of complexity.

And since the acquisition community on the government side has always been focused on the piece parts, in order to handle that complexity effectively and help us do a better job at the system of systems level, and to control that was the reason why we brought in as a partner in this development the lead systems integrator.

And so it is that blend of the technical expertise that we still have in the piece parts and the integration of complex weapons, of complex systems that we desire to get from industry where we went out and competed for a lead systems integrator.

Mr. ABERCROMBIE. I assume what you are saying, if I were to say could you offer an opinion on the decision or are you satisfied with the lead systems integrator process, you would say not only are you satisfied, but you are saying it is probably the only way to go with the level of complexity we are talking about.

General YAKOVAC. To be honest with you, when I was told I would be the manager of this program if I took this job, the first thing I asked, because I would never been involved, what is a lead systems integrator.

So I immediately went to Houston, Texas, talked to the Space Shuttle people. I went to Missile Defense Agency (MDA) and talked to them and tried to get some understanding of what a lead systems integrator really would do.

And now as I look back on that decision, I believe we would not be where we are today nor do I believe we could get to where we need to go without that proper relationship. And that is what it has to be. They cannot be lead in the sense of taking this program where they want to take it. We have to control the reins, and they have to help us get there.

Mr. ABERCROMBIE. Right. Would you recommend any changes to the way—is that balance working properly now? Would you recommend any changes to where we are or do you think we have things balanced out pretty well?

General YAKOVAC. Right now, after a year, and I make a quarterly visit to the review with the government and industry, I am satisfied that we are still on track of us being in charge and holding the reins and them helping us get to where we need to go.

But you have got to continue to make sure that that is the balance that you have. And today, yes, I am satisfied. I would not recommend to my leadership any changes at this time, as we continue to evolve how an LSI does things.

Now, that being said, at the beginning in my prepared remarks, we got together as a team and we laid out tenets that we said in our relationship we wouldn't violate. And so we continually go back to those when we meet and say, "Are we still okay with those?" And those really guide that relationship, because we felt that we had to have a baseline to start to and to compare to as we went along.

If we begin to violate where we have to answer, "What is the right tenet under number 2," are we going in a direction we don't want to go?

So those are the things that hold us together right now is those tenets.

Mr. ABERCROMBIE. So you put a structure together to help define that relationship and how that all is going to work.

General YAKOVAC. Absolutely. Job one at the beginning was not the relationship, it was to find some basis for it.

Mr. ABERCROMBIE. Now, it would seem to me that, at least—I used to sell for IBM a long time ago, and sometimes when you are dealing with a lot of science and you are trying to explain it to sort of average kinds of people that make decisions, you have got to kind of make that jump.

Would, in this case—is there a potential tension or problem with the fact that you are looking in a very visionary sense at what something is going to look like. And it seems, I would imagine to you, fairly tangible how it is going to work. But to somebody else it may be—boy, it is hard to get the concept, even.

Does that make it then a threat that people are going to come and try and take money away from it and undermine it just because they don't understand it? Is that a kind of a constant thing that you have to pay attention to?

General YAKOVAC. Yes, sir.

Mr. ABERCROMBIE. Because, I mean, if you de-fund it, then that is going to hurt the schedule, isn't it?

General YAKOVAC. Yes, sir. My contention is that the best way we could keep this program of record going is for information exchange.

Any time and anywhere, I am more than willing to come over and dialogue with anybody. And I think the members of your staffs know me well enough that I have don't that. Because this is so different and it is challenging that you can get, like you said, enamored with the technologies and then not understanding the management process by which we are trying to manage the risk. And I admit—and I did in my statement—there is risk. But I think we have identified it. We have identified off-ramps.

The key here is to be true to what your plan is. We historically have not kept to the plan. We have got to a decision point and said, "Well, look, a little bit more money and we will get there."

We can't afford to do that in this program. If we get there, we have got to make the choice. We take the off-ramp or we stick with it. And then we stick with the consequences, because in most case, the issue will be cost. And as was stated in the chairman's opening remarks, this program cannot afford to pull any more resources away from other missions that the Army has to perform.

And so it is that discipline in the process, and information sharing that people have access to in the way that we have presented even the program. This is the first program I know of record, and when we offered it, I was told by a lot of people, "Don't do it." Where people on the staffs, on your staffs, have full access to our earned value management.

We will train them, we will give them access to it, and they can come and report to you on a day-by-day basis, if that is what they want to do, how this program is doing in terms of cost, schedule and performance.

Now, the downside of that is, for somebody who may not know exactly what that means, I can be answering, or the folks who with me, a lot of e-mails about, wait a minute, this just went south. Well, no, it didn't. We are okay. Let me tell you about it.

But the idea of information exchange was much more important than keeping something back. And I think that is the key to this.

Mr. ABERCROMBIE. My time is getting a little short, but very interesting what you are saying.

It seems like one of the things is going to really help produce a level of comfort with the program is if there is some fairly clearly defined, fairly tangible kinds of objectives, and you see those things starting to be met and people actually can see it and hold it and feel it, it seems like that is going to make a big difference to us.

Is your schedule set up to do some of those things so people can actually start to see pieces coming together?

General YAKOVAC. Yes, sir. About a year ago when we went in, we said the big thing that has to happen this year for this program to keep on schedule is for us to do trade analysis and come up with what would be acceptable to the user as the appropriate material solution to a requirement.

For example, when you look at the infantry carrier, which is part of this system, when we went into it there was debate based on

how this was going to fight what size weapon mounted on that vehicle would be acceptable. We had various options. We had options of what is available today. We had options of putting more money into it, both the weapons system and the munition.

We are now going through that trade. We are necking down now to a solution that is probably the best in terms of not technical, but meeting the requirements of performance by going to a cannon that the Marines already have and developed.

And so if we continue to make informed choices and we continue to balance cost, schedule and performance, then we can continue to be successful.

Is it easy to do? No. But that is the key to this. And that is the example, what you just asked.

We are making those decisions. We have a review coming up where we are going to bundle some of those and make some of those big decisions that will no doubt make, "Meet the Press." And people want to know, why did you pick this caliber of cannon, or why did you do that? What is going to be the balance of cost, schedule and performance? And we are doing that today.

And I think as we make those decisions, and people see that we are not going for the far-out technical solution, they might say, "Hey, maybe they are going to make some good decisions about reducing risk.

Mr. ABERCROMBIE. And just one last quick question. When you started overall looking at future combat systems, did you have still some basic parameters of what sort of war fighting environment that you had to be able to deal with?

In other words, did you have some very broad parameters a modern army is going to have to deal with this, this and this? And so are you working toward a set of very specific kinds of things in that way?

General YAKOVAC. Absolutely. Before we ever had a program, the work, then it was tradeoffs, was to find those parameters. What would we need to do in the future? What type of army would we need? And what capabilities would allow that army to win and fight on that future battlefield?

So before you ever see a program, that work is already done. And it is vetted and it is discussed. We get the INTEL folks to come in and try to project out, and that is always kind of fun, because everybody has a different vision of the future. And then you agree on what it is.

And then you bring the war fighters, the guys who get paid to do that, not the acquisition developer, to sit down and say, based on that scenario and what we know today, here is the capability, the capabilities we think we need, not defined as specific technologies—

Mr. ABERCROMBIE. Right.

General YAKOVAC [continuing]. But in terms of capabilities. And then that is when we come in.

Mr. ABERCROMBIE. Right.

General YAKOVAC. We come in—say, based on what you want. Now, let us come back and give you the technical solutions to those capabilities that you have now outlaid, also based on how you intend to fight.

It doesn't do you any good to have the capability if you don't fight it that way. And so it is that entire process of doctrine that evolves out of TRADOC. It gets us then the materiel guy to come in and say, "Now that we know what that is and how you want to do it, let's partner with you to bring that to reality."

And that is how this program started. It didn't start with the materiel, it started with what you are talking about, as a vision of how we want to fight and where we want to be.

Mr. ABERCROMBIE. That is really encouraging. Thank you very much, General.

General YAKOVAC. Okay.

Mr. ABERCROMBIE. Thank you, Mr. Chairman.

Mr. WELDON. I thank the gentlemen. I thank you both. We have a number of other questions that I would want to ask of you, but because of time and our second panel, we want to get to the other witnesses.

But before I do just let me commend you both. Your passion, your sincerity, your intelligence is obvious, and your approach to this problem we have in terms of funding adequate resources to meet the needs that you have identified.

Again I will repeat: All of us want to help the Army move to this new posture. And, General, you have done a more than commendable job in laying out the case and showing the vision. But the problem exists above you. And I am going to tweak some people above you right now, both within the Army and within DOD.

If you look at all the services and their increased funding for next year, the Army is lagging way behind the caboose. The Air Force is getting a 12 percent increase in funding. The Navy is getting an increase. Even the Marine Corps is getting a slight increase.

The Army's total modernization is a six percent decrease. That is outrageous. It is outrageous when the OP TEMPO rate and all the grunt work being done over in Iraq and Afghanistan, probably 80 or 90 percent of it is being done by Army personnel.

And we are using up all this equipment and causing equipment to be destroyed and having to modernize it. And here is the Army trying to meet that need and then being asked to modernize for this transformation into the future, and you can't do it. And so because the bosses up that push the pencils in the Pentagon don't want to make tough decisions, they push it on us.

We have got a net decrease of six percent for the Army's modernization for next year. And it is going to be extremely difficult to meet the needs that you have to allow you to do what you are doing and still meets the needs of the next panel, which are going to be the immediate needs that the Army has today.

And that is unfair. In fact, I would say it is almost immoral that our soldiers on the battlefield and their overseers are being faced with this kind of a situation.

And I would send a signal to the brass and the Joint Chiefs, and I would send a signal to the secretaries and Secretary Rumsfeld himself: Get your act together. I mean, the Army is being decreased by six percent, and yet it is being asked to carry the bulk of the work. That is just not fair, it is not logical, and it doesn't work.

So I will say what you can't say, and I will keep saying it over and over again, because that causes us to be in the problem that we are in right now.

Thank you both for your excellent testimony and your work.

We will now ask our second panel to come forward.

Mr. FRANCIS. Thank you, sir.

Mr. WELDON. Welcome.

General HANLON. Thank you, Mr. Chairman.

General GRIFFIN. Good morning, sir.

Mr. WELDON. General Griffin and General Hanlon, we are pleased to have you both here. And I am glad you brought along some visuals. Being an old teacher, I think the best way to tell a story is to show some visuals.

So we have some great examples, and I hope you blend them into your statements today. Your statements are accepted as a part of the record.

You have heard from our first panel, and you know the challenge we have. Now you are going to give us a greater challenge, and that is the needs that we have to modernize the existing force structure. And we want you to be as candid as possible, because we have got to marry these two together with an unacceptable level of dollars that are being pulled at the request of the Secretary's office.

So, General Griffin, please proceed with your opening remarks. Both of your statements have been entered in the record.

STATEMENT OF LT. GEN. BENJAMIN S. GRIFFIN, USA, DEPUTY CHIEF OF STAFF, G8 (PROGRAMMING, MATERIAL INTEGRATION AND MANAGEMENT) UNITED STATES ARMY

General GRIFFIN. Yes, sir. Mr. Chairman and distinguished members of the committee, thank you for the opportunity to appear before you today, along with my friend, Lieutenant General Ed Hanlon.

We take pride in our close relationship with the Marine Corps, both peace time and war time, and it is appropriate that we appear together to address your questions and share with you what we have accomplished and where we are going. We are an army at war, a military at war, serving a Nation at war. Our number one priority is to the war fight, and this emphasis is reflected in everything we do.

Requirements from the theater are resourced first, particularly force protection needs. At the same time, we are continuing to carefully balance current readiness with a need to invest in the future to ensure that your Army will remain relevant and ready for future requirements.

In the last six months, I have had the opportunity to visit our units in both Iraq and Afghanistan, most recently in February, to look specifically at where we need to increase and sustain support to Army soldiers and units.

In addition to these periodic visits, we have established a number of forward liaison elements in theater to facilitate information exchange and to help solve problems. We have dedicated officers stationed in theater at the Combined Forces Land Component

Command (CFLCC) in Kuwait, and the Combined Joint Task Force-7 headquarters in Baghdad.

And we have a liaison officer en route to Afghanistan this month. We also have liaisons with eight of the Army's ten divisions and all of the Stryker Brigades—all there to identify problem areas and help us expedite fixes.

With respect to the reserve components, we have people with the CONUS, who also provide us continuous feedback as we work with the enhanced brigades, National Guard divisions and Army reserve units.

Let me express the Army's appreciation for the outstanding support that your committee and staff have provided in supporting programs to protect our soldiers, including the Interceptor Body Armor (IBA), the Army's Rapid Fielding Initiative (RFI) to better equip our soldiers—and so we do have our handout, which lists exactly what is included in the Rapid Fielding Initiative, and I can address those if you like—and also armor protection for our vehicles.

These enhancements are saving soldiers' lives, and your support has helped greatly.

There are some items I would like to mention quickly that I know are of particular interest to this committee. First, Army modernization and transformation. We have heard concerns expressed that the Army is delaying substantial modernization of the force until the introduction of the Future Combat System. This is not the case.

For example, during the program period, the Army intends to invest \$2 billion in unmanned aerial vehicles in both current and future UAV programs. I can address that in more detail in the question-and-answer, sir, if you would like.

We have fully funded six Stryker Brigade Combat Teams (SBCTs). The first, as you know, is doing a great job in Iraq today. Two hundred eighty-four Block 3 Apache 864 helicopters, the UH-60M helicopter upgrade, the development and procurement of the aerial common sensor, which will occur in 2008, and Blue Force Tracking, a capability to Army forces.

Termination of the Comanche program has allowed us to fix our identified shortfalls in Army aviation. We have a \$5.4 billion strategy to modernize our truck fleet, and we have a group looking currently with respect to the 611 POM, how better to transform our truck fleet across the board.

That 5.4 is what we have currently in the program. The Comanche termination generates \$14.6 billion that we can reallocate to aviation.

And we also have a plan to field the Army Battle Command System to select units in both the active and reserve components over the next two years.

General Schoomaker, the Army Chief of Staff, has established 17 immediate focus areas to channel on the efforts to win the Global War on Terrorism and increase the relevance and readiness of the Army. One of these focused areas is modularity.

I cannot stress enough the importance of the Army's modularity initiative. If we are to remain a relevant and ready force, the Army must modularize. This brigade-based plan will allow us to be more

responsive and better enables us to be joint and expeditionary in nature. It also allows the Army to meet the needs of the strategic environment now and into the future.

We are making great strides to meet this crucial requirement through shifting existing equipment assets to the fullest extent possible, but we anticipate that the procurement of equipment and vehicles will be critical to meet our desired end state for both the active, the National Guard and the Army reserve.

Sir, I know you are also concerned about the Army's ability to maintain its readiness in key areas like ground combat vehicles, aviation and trucks. We continue to experience battle losses of equipment, and the pace in the environment of Iraq and Afghanistan are taking a heavy toll on Army equipment.

Whenever possible, we are making repairs in theater, and have established multiple maintenance sites in the region for this purpose. We are making great use of depots, and in fiscal year 2004 the Army received \$1.2 billion toward our needs for depot maintenance.

We are making smart decisions on the timing and extent of maintenance to be performed that takes into consideration the rotation of deploying forces, modernization in plans and modularity initiatives.

We have an aggressive recapitalization program that takes systems to zero hours and zero miles. This recap program includes 16 funded systems, and is currently programmed for \$11.6 billion over the program, and when complete will have recapitalized the equipment of 2-1/3 divisions worth of equipment.

In the May time frame, the Department of the Army and the Department of Defense will conduct mid-year reviews to analyze fiscal year 2004 expenditures. These mid-year reviews are ongoing at this time. We expect the results of these mid-year reviews to be complete probably in the May time frame. After this review is complete, the Department of the Army will have a better idea what it will be able to accomplish in the areas of modularity, reset and other programs this year.

I have spoken about what we are doing for the current force, but I do not want to diminish the need to balance risk between the current and the future force. We must ensure that today's soldiers have everything they need, but we must also remember that the Future Combat System is the centerpiece of the Army's future. The FCS program budget for fiscal year 2005 is \$3.2 billion, and over the period of 2005 through 2009 is programmed for \$22 billion.

Our great Army in the field today was the future force a decade ago. We must maintain this careful balance between the current force and the future force, and we must continue ways to spiral future force technologies into the current force whenever possible.

Two examples—UAV and the network. Much work has been done here and in theater to provide support to our soldiers, but much work remains.

When asked what my number one focus and concern is, it is getting protection to our soldiers serving in Afghanistan and Iraq.

I am extremely honored to be here, and await your questions.

[The prepared statement of General Griffin can be found in the Appendix on page 542.]

Mr. WELDON. Thank you, General. I appreciate your comments. Are you finished? Okay. Thank you.
General Hanlon.

STATEMENT OF LT. GEN. EDWARD HANLON, JR., USMC, DEPUTY COMMANDANT, COMBAT DEVELOPMENT, UNITED STATES MARINE CORPS

General HANLON. Thank you, Mr. Chairman and gentlemen of the committee. It is a pleasure to be here today with General Griffin.

And, Mr. Chairman, I just wanted to mention to you that I have brought with me a couple of the general officers that I work with. One of them is Brigadier General Tom Waldhauser, who commands our war fighting lab, who was also one of our combat commanders in Afghanistan and Operation Iraqi Freedom last year. And also our Marine Corps Systems Command Commander, Brigadier General Bill Catto, who had the laboratory before this assignment.

And these two gentlemen, I would say, work with me daily—that wouldn't be fair, it is probably hourly—on the issues that we face in making sure that our Marine Corps is ready to fight.

Let me start my comments today, Mr. Chairman, with force protection. For many years now the Marine Corps has recognized force protection as one of the six battle space functions that we address in the development of any war fighting capability. This function covers a wide range of both active and passive measures undertaken to improve the security of our forces.

A year ago, during the major combat operations phase of Operation Iraqi Freedom, we saw the success of many of our force protection measures, such as improved body armor, which is credited with saving Marine lives and with reducing the severity of injuries to others.

Another success story is the capability which Ben referred to a few minutes ago called Blue Force Tracker. Marine and Army forces in Iraq last year demonstrated this joint capability which enabled them to maintain increased situational awareness regarding the position of U.S. Army and Marine Corps ground units.

This was, sir, a superb tool, not only for its value as a force protection asset that aided in preventing fratricide, but also is a means of simply coordinating complex ground operations.

The Marine forces that recently deployed to Iraq to participate in coalition security and stability operations have not only retained these capabilities, but will also benefit from some additional force protection measures that we have undertaken. One of the primary thrust to coalition forces in Iraq is that posed by the enemy's use of improvised explosive devices in roadside bombing attacks and convoy ambushes, which we see every day in the newspaper.

Recognizing that Marines would confront this threat, we initiated a vehicle hardening program like the Army did that has provided a degree of armored protection for approximately 3,000 of our thin-skinned vehicles, such as our Humvees and our heavy trucks.

We accomplished this through the addition of armor plating to our vehicle doors, the installation of armor kits and the use of ballistic blankets to provide an additional layer of protection from fragmentation.

We also recognize the need to address vehicle hardening considerations for the long term. This is a broader issue for the Marine Corps. At present, we are evaluating alternatives for a permanent solution to this challenge with regard to our current fleet of vehicles.

Mr. Chairman, you will also notice that I have included in my prepared statement a review of certain force protection measures that are underway at our bases and our stations around the nation. We recognize that our supporting establishment provides the critical infrastructure that supports and sustains the forces as we deploy overseas to the global war on terrorism.

And we have a number of initiatives in progress to enhance the protection of our infrastructure. These include bottom-up vulnerability assessments, as well as the implementation of specific measures to provide protection against unconventional threats such as chemical, biological and radiological attacks. Many of these are, indeed, joint programs. And you have my assurance that the Marine Corps is an eager and enthusiastic participant.

Mr. Chairman, I would now like to address the Marine Corps' equipment initiatives that grew out of the Army's lessons learned of Operation Iraqi Freedom. Naturally, your Marine Corps and Army have been working closely at all levels to exchange information regarding Operation Iraqi Freedom.

We have several forums in place to share these lessons. There is an Army-Marine Corps board which both Ben and I sit on, which meets frequently at the senior flag officer level for the sharing of information with regard to Operation Iraqi Freedom, as well as for the coordination of efforts to better prepare both the Army and Marine forces scheduled to deploy into Iraq.

We also hold a series of Army and Marine Corps war fighting conferences, which are conducted at the one-and two-star level, followed by sessions involved in the senior leadership of both services. In fact, Mr. Chairman, last week I hosted a one-and two-star Army-Marine Corps war fighting conference at my headquarters at Quantico.

At these conferences, we address both near-term issues such as lessons learned in ongoing operations, as well as future plans for transformation of both services.

In addition to these established venues, you will find the Army and Marine Corps cooperate regularly on an informal basis. For example, the officer-in-charge of the Army's Rapid Equipment Force (REF) briefed me personally on the Army's program for quickly identifying needs and developing solutions. We have learned a lot from the Army.

We have a similar process, the Urgent Universal Needs Statement process, which we have used to rapidly respond to Army and Marine Corps lessons learned, and urgent priorities of our deployed forces.

As a result, we have initiated a number of equipment-related actions to improve the readiness of our forces, one example being the 2nd Battalion, 8th Marines, before deploying to Afghanistan last fall. They received specialized equipment designed specifically to improve its ability to fight in mountain and cold weather environments.

Further, much of what the Marine Corps learned about protecting the force from the hazards of IEDs, we learned from our brothers in the Army. In fact, we have established a special counter-IED working group that coordinates very closely with the Army and with the Office of the Secretary of Defense to mitigate this threat.

We are also providing our Marines with new tactics, techniques and procedures, as well as the training to make them work to full advantage. Again, the Army has been a great resource for us in this area.

Let me conclude by reiterating my thanks to the subcommittee for the opportunity to share with you the Marine Corps story.

Mr. Chairman, earlier today in your opening comments, you told the story of Lieutenant Bernstein, who I think was one of your constituents, and it was a very compelling story, albeit a sad one.

I have over in Iraq right now the Marine Corps Lessons Learned team which reports directly to me—60 officers led by a colonel. Their job is to report daily back to me on things they are learning, not only from the Marine Corps experience—we have been there now basically in our Area of Responsibility (AOR) for about 2 weeks—but from the Army as well.

As you know, we have a number of Marines who have already been wounded, who have now already started to come back to Bethesda. I have had my lessons learned team go up and talk to each and every one of those Marines. I did it myself yesterday.

And when you were telling your story earlier today, I will tell you, there were four of those Marines in ICU yesterday. Three of them could talk to me, one of them could not.

And so I want you to understand, we are taking this very, very seriously, sir, in terms of how we take care of those Marines, so that we have fewer and fewer of those casualties coming through Bethesda.

One of the things I did—and you saw this earlier—is I have asked one of our young officers here, Captain Pat Dienhart. Patricia is a combat engineer of 1302. She works at our Marine Corps Systems Command.

She is also a combat veteran of Afghanistan and Iraq. In fact, she worked for then Colonel Waldhauser. I have asked her just for a second to stand up to show you some of the latest gear that we are looking at in terms to protect and equip our Marines over in Iraq.

Would you, please, Captain?

[The prepared statement of General Hanlon can be found in the Appendix on page 556.]

Captain DIENHART. What I have here is an M16 A4, which is the new and improved version of the M16, and also it has the new advanced combat optical guide, also known as the ACOG.

It has a LED-laser that when you look through the lens, which magnifies at 4.5 times what you normally see, you can actually put a red dot on a target, and then you can essentially shoot the target.

Also, right here, I have this button right here, which is for this, which is the personal road radio, also known as the intra-squad radio. This has a range of 500 meters on open terrain or also 3 to 4 stories in a building for urban terrain. It's per squad so that we can talk amongst each other. I also have a tactical handheld radio

right here in my pocket, which is for speaking to helicopters or higher headquarters, such as the company or battalion level.

I also have right here, sir, is a phrasealator, which is a new piece of equipment that they use in Iraq, and you basically can talk into this phrasealator. You take a certain language—Iraqi, Farsi, whatever has been loaded into this, and it says the phrase in that language, so you can see, if you want to say, “drop your weapon,” and it will say in Iraqi, “drop your weapon.”

You can also enter phrases into this via a translator if there are certain phrases that are not loaded onto this.

Yes, sir. I can pass this around later on, sir, but there is a speaker in it.

If I dropped my weapon, sir?

Mr. WELDON. We want you to do the ultimate challenge. Take—

Captain DIENHART. Drop your weapon. That is not even at maximum volume.

Mr. WELDON. We want you to do the ultimate. Take that device back to OSD and speak into it, “Give the Army more money.” [Laughter.]

Mr. WELDON. And see if you can translate that into language that the Secretary and the Joint Chiefs can understand. Can you do that?

Captain DIENHART. I will try, sir.

This back here is the new lightweight goggles which has a double-point strap, which is much better than the old goggles, which tended to shake around on your head quite a bit.

I also have ballistic goggles, which are for fragmentation up to 650 feet per second, so it's great for any kind of fragment.

What I am also wearing here is a new auto-tactical vest. It also has nine-millimeter protection on the sides, over the shoulder and also here on the side. And inside this vest I have new small arms protection insert, also known as a SAPI plate. And the one I have here was actually used on the range. It is good against 7.62-millimeter rounds, which is actually is much more. This is 5.56. So 7.62 is what this was shot with at point-blank range, and as you can see it put three holes into the plate first, and there is only welts on the back. So it is a very effective piece of gear.

And then I am also wearing the new digital camouflage, sir. Captain Taliotta has the unmanned aerial vehicle, sir. This is used for aerial reconnaissance at the battalion level. There is one camera right here on the head and also a camera at the bottom. There are two different ones. One is for daytime use, and one is for nighttime use with infrared. It lasts about an hour. They can send it out and you can see the small—I don't know if you can see that, sort of small right here. And there is basically a rubber band that attaches to it and you sling up in the air.

Once this reaches 25 miles an hour, it senses it, it takes it in and then it—the battery life is good for an hour, and it is a rechargeable battery. It has automatic report detection so that if it loses the radio waves from the ground control station, it automatically comes right back to its—it has a homing device there.

And it breaks apart into five pieces. This nose comes right off. The wings come off, the tail, and it fits into this small bag.

Each system comes with three of these little air tracks and one track, in case they break you have a backup.

Mr. WELDON. It is a great UAV. We had a hearing on it a while ago, and I have seen the technology. I don't think you have the capability there for that UAV to track your unit if you are going down the road. You don't have the software to do that, do you? That won't follow you, if you are——

Captain DIENHART. You can set grid coordinates into the UAV, sir——

Mr. WELDON. Right.

Captain DIENHART [continuing]. And it goes to where you want that grid coordinate. So you actually—you need to monitor the screen and tell it what to do.

Mr. WELDON. Right.

Captain DIENHART. You can override the grid coordinates capability as long as you say, "Turn left, turn right——"

Mr. WELDON. There are systems now in UAVs about that size that is being fielded, actually, by the Marine Corps, I believe.

General HANLON. Silver Fox, sir.

Mr. WELDON. Silver Fox—that actually has the AIM software——

General HANLON. Yes, sir.

Mr. WELDON [continuing]. Developed out West, that actually stays around the unit as they are going down the road, or whatever it is. So it is a constant—so you are doing great work.

How much weight are you carrying in that outfit?

Captain DIENHART. Each of these plates are four pounds, and the actual vest is seven pounds. When you have both plates in, it is 15 pounds.

And what I have right here is a cutout from—and I can bring this back there, as well, sir—it is from a SAPI plate that has a 7.62 rounds in it. And as you can see, it blocked about two-thirds of the way in. So it was effective.

Mr. WELDON. What don't you have on there that you need?

Captain DIENHART. Right now——

Mr. WELDON. I mean, you have been out in the field. What don't you have that we should be getting for you? If you had no question on dollars, what else would you want? Do you feel like you are——

Captain DIENHART. Yes, sir. I didn't have any of this newer gear in Afghanistan. And in Iraq we had these with the SAPI plates, and it gives you tremendous amount of confidence, and the Marines a tremendous amount of confidence to have to go out there in the crowds and——

Mr. WELDON. The only thing I would want, beyond what you have is an undergarment that you would wear that would give you not just GPS locational information, vertically and horizontally where you are, but also would transmit your vital signs back, so your commanding officer at any given time would know how well you are doing, how you are breathing, your pulse, as well as where you are located. We have that technology——

General HANLON. Yes.

Mr. WELDON [continuing]. But we have not yet put in the system. But it sounds to me like you seem like you have got pretty much everything you need.

And you have—go ahead, do you have a question or a comment?

Mr. SCHROCK. How much protection is there on the shoulders and the arms? It doesn't look——

Captain DIENHART. It's nine-millimeter, so——

Mr. SCHROCK. All right.

Captain DIENHART. It's nine millimeter point-blank range, sir.

Mr. SCHROCK. All right.

Captain DIENHART. So——

Mr. SCHROCK. Point-blank range, Okay.

Captain DIENHART. Yes, sir. But I mean, I know a story from a Marine, for example, that had a very, very thick notebook in the front here that he was shot at a longer distance, and that notebook stopped it. That is point-blank range protection.

Mr. SCHROCK. But that is critical for protecting——

Mr. WELDON. So it won't go into your chest cavity or anything. Yes.

Mr. SCHROCK. So that's a good idea.

Captain DIENHART. Stopped it right here. And then also the shoulders.

Mr. WELDON. When we took our trip over to Iraq and Afghanistan, we stopped on the way back at Ramstein and went to Landstuhl and talked to the soldiers there. And one of the soldiers had had significant shrapnel wounds, but they were only on the outer extremities. Totally protected in the chest area and the upper arms because of the capability we have.

So we are doing a good job, and we applaud you for that. And we appreciate you coming in.

General HANLON. Thank you, Patricia.

Mr. Chairman, you know, she was mentioning the ballistic goggles. And I was telling you in my travels up to Bethesda, in talking to each of the young Marines up there, most of the ones who were there—in fact, all of them had been hit by IED shrapnel of one sort or another. Most of the injuries were either in the legs, below the armor, or in and around the face.

And so one of the things I have asked my guys to look at is what can we do—almost like, if you think about what race car drivers wear, you know, the complete 360 degree helmet kind of thing. Of course, that gets very hot in Iraq in the summertime. But, I mean, looking at these kinds of things that we might be able to use to be able to give better protection to the neck, the throat and particularly to the eyes. And so these are some of the things that our team is going to be looking at.

And, Mr. Chairman, that ends my statement. Thank you.

Mr. WELDON. Oh, that was fantastic. I think you ought to get the Captain and go around to all the offices. She is your best—she did a fantastic job—your best salesperson, I think.

So thank you, Captain. Great job.

General HANLON. And she is indicative, sir, of the fine soldiers and marines we have over there.

Mr. WELDON. Where are you from, Captain?

Captain DIENHART. I am from upstate New York, sir.

Mr. WELDON. Upstate New York, great.

Well, it is good to have you here. Thank you for your great work.

And we thank our commanding officers for being here for the great work in developing this breakthrough technology.

I will go to Mr. Cooper first, and then I will save my questions for the end.

Mr. Cooper.

Mr. COOPER. Thank you very much, Mr. Chairman.

I was very impressed with the presentation. I am still worried, though, about actually getting all this fine equipment out in the field where it is needed the most.

I was in Iraq in December, and it wasn't out there yet. And all we have heard is a rolling delay and when the SAPI plates would be available to all our troops and how many years it is going to take to make sure we have armored Humvees.

I am worried that we still have too much of a bureaucratic attitude, and we are not using all national means to get this equipment manufactured and deployed.

General HANLON. Well, Mr. Congressman, I can speak for the Marine Corps.

Mr. WELDON. Before you answer, would the gentleman yield on that? Because I was going to bring this up and didn't, but it is a good segue.

Would you answer for the record the media's claim that we don't have enough of the plating for the soldiers, which was reported to us last week, that we are actually forcing families to buy plating for their soldiers. Would you include that in the answer to Mr. Cooper?

General HANLON. I will let Ben talk about the Army, the soldiers, because I did not see that media report. But I will tell you—and Bill Catto's right behind me, he will correct me if I am wrong—but every one of our Marines that are over there, Congressman, have the SAPI plates and the protective vests and the equipment that they need.

All of our vehicles right now, over 100 percent of them, have at least the minimum protection that they needed on the vehicles that we sent over with the Marine Corps now, sir.

Mr. COOPER. I would ask you to have a purple suit attitude here, because whether they are active duty, Marine, Army, Guard or Reserve, everybody in harm's way needs the best equipment. And, at least the best we can tell, it is—

General HANLON. Sir, you are absolutely right. But my responsibility is with the Marines, and I will ask Ben to talk about the Army.

General GRIFFIN. Sir, we have today in theater enough of the outer tactical vest (OTV) and the SAPI plates to equip all of our soldiers and DOD civilians. If reduction—

Mr. COOPER. Does every living soldier there have the SAPI plates?

General GRIFFIN. Sir, we have in theater being distributed—in fact, this month, as of today, we are now fielding outside of theater both the OTV and the SAPI. I have gotten from the senior commander there, Army commander, that he has adequate OTV vests and SAPI for all of our soldiers.

Mr. COOPER. So that mission is complete as of today.

General GRIFFIN. Yes, sir, it is.

Mr. COOPER. And no CODEL will find a soldier over there who is without this gear.

General GRIFFIN. Sir, they should not find a soldier. Now, we intentionally continue to ship both OTVs and SAPI into theater until we got a thumbs-up from the commanders that they had enough for all of their personnel. And when they did, then the decision was made then we would equip other units in CONUS and OCONUS with OTV and SAPI.

Up to just recently when a unit redeployed back to CONUS, they were in fact turning in, in country, both OTV and SAPI. We have ceased that now so that the units that now redeploy back from service there will in fact redeploy back with their OTVs and SAPI.

Mr. COOPER. That is OTV and SAPI. How about up-armored Humvees? How long is that going to take?

General GRIFFIN. Sir, up-armored Humvees we are ramping to 330 per month—I am sorry, 300 per month production. Today, we are at about 185 per month.

By the July-August time frame, we will have enough in production and in theater, probably with normal ship time, as fast as we can get it there is up to about 60 days, so it should be about October. And we will meet the requirement, the current requirement, sir, for 4,388 by the end of September, first of October.

Now, sir, the requirement could very well change, based upon the operational mission. And, for example, I know for a fact that there is a requirement back in the billing for 12 additional up-armored Humvees. So add that to the 4,388. But to meet that current requirement what I just gave is the time frame.

Now, if the requirement changes, sir, then we will continue to ship up-armored Humvees. We, across the Army, have shipped available up-armored Humvees into theater. We have gone through a ramp process, if you would, to get us to the 300. We are awaiting the \$331 million to finish with respect to production.

On body armor, there is another \$292 million, which we expect that are either coming from reprogram, reprogramming or IFF funds.

Mr. COOPER. I hear a lot of words——

General GRIFFIN. So there is one other aspect: There are the kits that we are putting on. We will ramp up to a production of about 800 kits per month. And requirement for Humvee kits is 8,400, and the requirements for FMTV is 1,150; HEMTTs, 1,080; PLS, 800; HETS, 500; M915s, the tractors are 250. Now, that requirement, sir, again, as it changes, then we will send more kits.

We have also established six sites in Iraq to apply the up-armored kits, protective kits to the vehicle. But as you know, the kit does not provide the same level of protection that the up-armored vehicle does.

Mr. COOPER. I have heard a lot of nice-sounding words, but I am still worried that, number one, we underestimated the demand for these vehicles.

Number two, while we are ramping our capability, it doesn't exactly sound as robust as it could be for the greatest nation in the history of the world, and a nation that is spending more on our defense than every other nation on earth combined—and we just

heard testimony of the Future Combat System, and there are a lot of good folks who are focusing on, you know, those nice items.

But meanwhile, our soldiers are dying every day in Iraq, partly due to the fact that we don't even have basic, primitive armor for our vehicles. So it is nice to hear that you are up to 330 a month, or whatever. But, you know, this is a Nation that fielded incredible armament during World War II, and every other conflict we have been in. And considering our automotive capacity and our ability to do almost anything when we set our mind to it, it is still sounding to me like a little bit of a late and feeble response.

So you are a professional military man; I am not. Are doing a good enough job for our soldiers today?

General GRIFFIN. Sir, there is a combination of things that we are doing.

Mr. COOPER. How about a yes or a no?

General GRIFFIN. Sir, we never—

Mr. COOPER. Are we doing a good enough job supplying up-armored Humvees to our soldiers?

General GRIFFIN. Sir, I think the answer is we are doing the best we can right now. Do we ever do—are we ever doing enough? If you asked me what keeps me up at night, it is body armor and up-armored Humvees. It is trying to get as many there as we can, as quickly as we can.

If you go and visit the soldiers there, you will see first hand that there are innovative things that they are doing to put extra protection on vehicles.

Mr. COOPER. The greatest nation on earth shouldn't have to force its soldiers to put sandbags in the bottom of these vehicles in order to have a slightly better chance of surviving.

And if you are unable as a professional military man to answer a question like that "yes," then I would suggest we are not doing all that we can to really help our troops survive under very difficult circumstances.

I wish we had more testimony in this and other committees from real troops in the field. And I respect our generals. You are great. I am sure you served well in the past.

But there are men and women living and dying today in a foreign land who do not have adequate protection. And we hear long lists of numbers presented to this committee.

I first became aware of this problem last August, as many members did. And we were told with SAPI plates, oh, by December it will all be fine. Then it was January. Then it was February, and then it was March. And now it is April, and you say that requirement has been met.

Well, we are maybe out of Iraq by the time we get enough up-armored Humvees. You know, and we are the—we should be able to do it faster, shouldn't we?

General GRIFFIN. Sir, again, there are a number of things you do to protect a vehicle.

We lost a 113 yesterday in Iraq. We lose up-armored Humvees to explosives, whether it is a mine or a number of charges. There are other things that we do for convoys to protect our vehicles as they move along a convoy.

Anything short of providing the best protection we can, whether it is on the body or the vehicle or our soldiers, or any other military or civilian personnel serving, is—have we done everything we can, if we put them out there in a vehicle that is not totally protected? No. Because something else could have been done.

Are we maximizing the production to get—as the production capability ramps to the 300 per month to meet that production level, based upon the requirements today? Yes, sir.

Are we putting the dollars against it? Yes, sir.

One of the questions asked yesterday, if they had more money to put against it, could you give it to me any quicker based upon where we are as to steel, the glass, the workforce, the production capability?

Now, soldiers in the field are doing some innovative things with steel, putting it on sandbags in the floorboards of vehicles, other things to protect. We learn every day. You saw body armor that the Marine captain had on. The shoulder protection is something new. It is a lesson learned.

The kits are a short-term, interim fix, if you would, because we can produce more kits and get the kits over on the vehicles.

Mr. COOPER. Well, I thank the chairman's indulgence, but I am still worried that our nation, the greatest nation in the history of the world is not doing all it could and should be doing to protect these troops.

General HANLON. Congressman, if I may take a crack at this for a second. I want for the record, I want to say, lest we forget, the Marines we have in Haiti also have the SAPI plates and are protected. I want you to know that, sir. They do not have armored Humvees, because there is not a threat in Haiti for that.

Which brings me to a point. And that is, last night as I was preparing for this testimony, I asked my guys to tell me how many Humvees that we have in the Marine Corps, how many trucks do we have in the Marine Corps? We have about 19,000 Humvees in the Marine Corps total, sir.

If we had had the vision 5 years ago, 10 years ago, when we let the contract on these vehicles, thinking that we would be in the environment that you are talking about in, sir, in Iraq, every single one of those vehicles would be hardened. I guarantee it.

And this has brought up an interesting discussion in our own service. And that is—because we are hardening vehicles now as quickly as we can.

To answer your question, sir, we are. And I will only say one thing. It has brought up an interesting discussion in our own Marine Corps now. And that is, as we look into the future, every vehicle that we build from this day forward, should we automatically assume that every one that we build should be built—

General GRIFFIN. Mr. Chairman, if I could ask your indulgence—

General HANLON. Oh, I am sorry.

General GRIFFIN [continuing]. Just for one second?

General HANLON [continuing]. Should be built at a hardened standard?

And so, I mean, sir, I understand exactly what you are saying, and we are trying to get there as quickly as we can, sir.

General GRIFFIN. Could I go back and follow up one? General Schoomaker made a decision early on after coming on board as the chief, that every soldier, active guard and reserve, would be equipped with body armor and SAPI. That is 840,000 soldiers. We are on the path to do that.

Every Humvee that we produce today, whether it is up-armored or not up-armored, will have the same engine, chassis, springs and shocks, so we can very rapidly put additional armor protection on those vehicles.

Mr. COOPER. Gentlemen, if the chairman would just indulge me one more question.

We chose the day to start this war. And this was a country very familiar with us, as a result of the prior Iraqi war.

Many professional military people seem to have assumed we were going to be greeted with roses, like we were liberating the French in World War II or something. This looks to be very hostile territory. And somebody, or some group of people, seems to have seriously underestimated the threat that our men and women in uniform are facing.

And, you know, hindsight is 20-20, but this wasn't a sudden engagement that was forced upon us. And it looks like to me we were terribly unprepared.

Now you are saying we need this is in the future going forward. Well, where were we a year ago? Or 2 years ago? Iraq has been a threat for a long time. And is it a sudden surprise that we, you know, their nature is so hostile?

Who is responsible for that miscalculation? Why is this a surprise? Why is the greatest nation in the history of the world so surprised this late in the day?

You guys are the professionals. This is a country we know pretty well.

General GRIFFIN. Sir, I want to answer that. That both the Marine Corps and the Army, and I am sure the Navy and the Air Force, aggressively capturing lessons learned and applying those as fast as we can.

I believe everything that can be done today to get protected vehicles and body armor to our soldiers is being done.

We are testing at Aberdeen 24-7.

Mr. COOPER. When did the ramp-up in vehicles occur?

General GRIFFIN. Sir, the real-the first request, basically as an addition to the existing up-armored Humvees, came as we started into the—at the tail end of the—as we went into Baghdad. And that initial request, I believe, was for 235 up-armored Humvees.

Mr. COOPER. Why didn't it start earlier, and why wasn't it a larger request?

General GRIFFIN. Sir, I think the key is that we are doing everything we can today to meet the requirement of today. And we do everything we can in the future to prepare ourselves for this type of situation.

Mr. COOPER. This is the fifth Muslim nation we are essentially trying to rebuild in the last 10 years. I hope we do learn the lesson.

I thank the chair for being so indulgent.

Mr. WELDON. Thank you, gentlemen.

Mr. Schrock is recognized.

Mr. SCHROCK. Thank you, Mr. Chairman. Let me just real quick follow up. And I don't want to plant words in your minds, General Griffin and General Hanlon, but could some of this be because we had never encountered some of the hostilities or some of the intensity of the hostilities we had before that we didn't have some of this stuff? Could that be part of that or not?

General GRIFFIN. Sir, we had tanks, we had Bradleys, we had some up-armored Humvees. So there was a combination of—and Strikers. Strikers provides—we designed and built the Striker. We put 14.5 protection on the Striker. It is very good. It has done very well in Iraq.

We adapt as fast as we can to a changing enemy threat. As you go around and visit the units in Iraq, some units are removing the doors from a Humvee, protected and non-protected, so the infantrymen can go down the street and point the weapon out the side of the vehicle.

They are doing other things, though, to protect that vehicle. As the enemy adapts, whether that is with IEDs or other tactics or techniques, then we adjust to that. We apply the slide armor to the Striker vehicle, as an example, based upon a threat. We have done some other things to our tanks and Bradleys.

We are continuing to try to design as light a weight material as we can that provides as much protection as we can. But in some cases, like the vehicle we lost yesterday, with the 113 traveling down the road with some of the best sensor type equipment we have. You are still very vulnerable and at risk.

While I was in Iraq this last time, I went to a site where there was an up-armored Humvee that 3 155-rounds had been detonated, an IED, in the vicinity of that vehicle. Three of the soldiers were killed, and the driver was thrown free but severely injured.

The challenge we have is to adapt to an enemy as the enemy changes. And how we adapt, whether it is with a UAV that is flying along, whether it is tactics, techniques and procedures, and it is a combination. And it is also equipment.

And we talk about the equipment here, whether it is an individual equipment or whether it is the vehicle. So it is a continuous process.

Now, with me today is Colonel Promotable Joe Votel, who heads the Army's IED task force, and very aggressive at applying lessons learned, capturing lessons learned.

Before units go over to theater, they are briefed on the latest threat—how the enemy is adapting, how the enemy is changing. This also occurs in theater, and is a continuous process. We share the lessons learned. We try to make the adaptations as quickly as we can.

Mr. SCHROCK. We have heard the colonel. The colonel has briefed us before. He did a magnificent briefing here a while back.

My general line of questions was going to be along the questioning of IEDs that General Hanlon spoke of, but I look at this, look at the Captain, she looks like something out of "Star Wars," and you look at this wonderful equipment.

But I just wonder, isn't there—and I wrote a couple of things here—isn't there some sort of a radar beam or a laser-type device or a scanner or a high-pitched sound system that could be under-

neath these hills and looking forward, so that they could detonate any IEDs that might be out there? I know that sounds kind of ultra high tech, but it just frustrates me that we can do all these wonderful—

General GRIFFIN. Sir, what I would ask you is if we could go into—if we could provide that to you in a closed session.

Mr. SCHROCK. Okay. Yes, all right.

General GRIFFIN. Because there are some classified things that we are doing—

Mr. SCHROCK. Great.

General GRIFFIN [continuing]. That are very effective, that—very aggressively doing, as well, that we could share with you.

Mr. SCHROCK. Yes. I should have—

General GRIFFIN. Both in aviation survivability, as well as ground survivability.

Mr. SCHROCK. I should have said within the confines of the classification of this forum. I apologize. But I would be interested in knowing—

General GRIFFIN. Yes, sir. I would be very happy to.

Mr. SCHROCK. I just dread getting up in the morning and turning on the news. I really do, because I just fear another one of our kids has been hit.

And I think there is something—now, I certainly understand Mr. Cooper's frustration. I don't think he was picking on you just to pick on you. He is frustrated. You know, we are both frustrated, because we want to make sure these kids are safe, and you do, too. Believe me, there is no question. But if we could get some information on that, or I could, I would be most grateful.

General GRIFFIN. Yes, sir.

Mr. SCHROCK. And believe me, we are so grateful and so appreciative of what you are doing. I know this seems kind of harsh, but we just don't want any more kids to die. I don't.

Thank you Mr. Chairman.

Mr. WELDON. Thank you, Mr. Schrock. And we are going to put in the record the exact numbers on the current add-on armor that we have. We had the numbers updated—how many are being worked on right now, how many have been installed, how many are—we are going to put that in the Congressional Record.

And we would ask you to check that number—

General GRIFFIN. Yes, sir.

Mr. WELDON. Ask our Staff Director for that.

What we get down to, Generals, and this is really, I guess, the core of this hearing, our number one priority is to equip our soldiers with whatever they need now. You will never have a question from the Congress in either party to give you what you need now and to give you the money. That is not an issue. Versus that need, compared to the request for funding for Future Combat System, which is a transformation, which is a big ticket item.

Now, we have heard the testimony today. And you have had to toe the party line, I guess, so to speak, that we are doing both okay.

But here is the problem. We have \$1.3 billion of Marine Corps unfunded requirements. We have \$5.987 billion of Army unfunded requirements. And that includes \$1.3 billion for vehicle bolt-on bal-

listic armor. It includes \$1.175 billion for the Rapid Fielding Initiative. It includes up-armored Humvees, \$704.7 million.

So here we have additional requests, which the services have given us, in the form of unfunded and funded requests, and shortfalls. And we have the robust funding necessary for the transformation, which we would like to give the \$3.2 billion.

So we have got to then balance the two and say, how do we—we want to do more. We want to do this yesterday.

And we want to give this—now, there is an issue, we can't do all this, because there is not an industrial capacity to do all this work that quickly, and maybe we are at that capacity. But that is the mix that we are trying to find.

And the bottom line is what I have said all along. And if I have offended some people in the Office of the Secretary, so be it. This whole budget for the Army to me is ridiculous this year—Army and Marine Corps.

The two services that have more soldiers on the ground, in theater, risking their lives and being killed and injured every day should, in my opinion, be the two services getting the biggest increase in dollars to meet these unfunded requirement needs, as well as the transformation for the next 20 years. That is not the choice we are being given.

Now, the Air Force is getting a huge plus up, and they probably deserve that. But, you know, we are losing soldiers every day. And this committee, as much as any other one, air or land, has got to take the money that is been requested by the Pentagon, and try to make sure in our minds we are satisfying the current needs of our soldiers, to the maximum extent possible.

And if that means we have to cut into the transformation for the future, I will guarantee that is what the numbers are going to do. And we don't want to be in that position. We want to give you the transformation, although we want to help control the costs of it, but at the same time, give you the immediate needs you have for today's soldier.

So the balancing act that we have is between these items. And I don't know whether you want to comment or not, but I think these are your figures—not yours, but the services': \$6 billion for the Army, \$1.3 billion for the Marine Corps unfunded requirements. That is our dilemma.

General GRIFFIN. Sir.

Mr. WELDON. Let me ask a question. General Griffin, on our first panel, we discussed the need to sustain our fighting tactical vehicles through 2020.

There is a basic sustainment program for the Abrams tank, known as the Abrams Integrated Management—AIM. How do we get the current force sustained to 2020, is there a funded equivalent program plan for the Bradleys, Humvees and trucks?

General GRIFFIN. Sir, currently, for the 3rd Armored Cavalry Regiment, when it returns from Iraq, we will field the M-1 A2 SEP tanks to the that force, which is the most modern tank we have.

The 4th Infantry Division is leading 90 some tanks in theater, which will be—and when they come back into CONUS, they will draw the M-1 A2 SEP tanks. So at the end of that, the two and

one-third counterattack corps will have the most modern tanks and Bradleys that we have.

We are going through a recap program and a reset program. The recap program is funded for a little over \$11 billion. The reset program we continue to work. I mentioned that earlier in the testimony, with respect to the \$1.2 billion that we got this year, and with respect to depot-level maintenance. And then, we continue to define, as best we can, what our requirements will be for 2005, with respect to depot-level maintenance and those things.

There are other things that we are exploring with both a combination of civilian contract and government depot, looking at refurbishment of tanks to bring them back to 1020 standards, as well as Bradleys, both in the same lash-up with respect to Bradleys and keeping them out in the 5050 depot level versus commercial. So we are very actively doing that and looking specifically at the costs and the best way to do that.

Mr. WELDON. I understand that you are making a valiant effort here. But I guess—and I don't want to put words in your mouth, but I guess the answer is, to 2020, we don't have an identified program funded. Is that correct?

General GRIFFIN. Well, sir, if you look at—for 2020 time frame, specifically, we know what the force—we know which tanks and Bradleys we will have around the force. We have looked at SEPs and M-1 A1's. We have looked at the AIM program. We know what we want to do for the Bradley upgrades. We know where we are putting the ODS plus Bradleys.

So I would say, do we have a plan with respect to that force? The answer is, yes, sir, we do.

Are we putting that into the POM? Yes, sir, we are.

And that ties again, back into the previous discussion on the 43 brigades and the modularity. And as we go through that 43 brigade active component force, the combination of Strikers, heavy and light airborne type forces.

Mr. WELDON. Thank you, general.

General, did you want to add anything to this, General Hanlon, or no?

General HANLON. Well, sir, our M-1 A-1 main battle tanks are to carry us out to about the year 2015–2020 time frame. I know you know this, Mr. Chairman, but our main amphibious assault vehicle, the AAV, we are taking a number of them—in fact, we are close to 700 of our 1,000 inventory right now—and we are modernizing them in the interim by putting in Bradley engines, suspension systems and transmissions.

We are calling them the rammers version. And really what it does, it brings that vehicle up to its 1972 basic requirement, because we had to weigh them down with armor to protect them. And so we are bringing them up to those standards.

Our light armored vehicles (LAVs), which of course, are one of our main combat vehicles, we have got a service life extension program (SLEP) program underway for all 750 of those vehicles. Ultimately, we will convert, hopefully, to the expeditionary fighting vehicle, the EFV, which is in advanced testing right now in the ocean out at Camp Pendleton, somewhere around the 2008–2010 time frame.

And we are looking very closely at the—I was listening, sir, to the FCS discussion earlier today, because we have been watching with the Army where they are going with Future Combat System, to see where along the way the Marine Corps might be able to leverage in on that.

We know we will have a requirement, sir, to replace our M-1 A1 and our LAVs in the future. We have a program that we are calling the MEFV right now, but we are looking to see what happens with the Future Combat System to see where we might be able to marry up and leverage with the Army. And, in fact, it will be a joint program that will be set up here in the future to do just that. And I think that is where we are with it right now, sir. It seems to be working well.

MR. WELDON. I thank you both for your outstanding testimony and again for your service.

I apologize, I have to run. I am going to ask Mr. Schrock to assume the chair and close out the hearing with Mr. Abercrombie. But to both of you, I say thank you for a job well done, and thank you for everyone that came in with you.

MR. SCHROCK, would you take the chair?

MR. ABERCROMBIE. I apologize to you. I missed your testimony, but I have been through it. You know the drill that we go through.

The fact that we are not here does not mean that we are not paying attention and are in any way disrespectful to the process underway here. So if I do go into a little bit of something that has been—you have already addressed, if you indulge me in that. And if the chair would, I would be grateful.

Have you both had the opportunity to read Mr. Francis' GAO report?

General GRIFFIN. No, sir. I have not.

Mr. ABERCROMBIE. Oh, Okay.

General HANLON. No, I have not, sir.

MR. ABERCROMBIE. All right. Then, if you will grant me for conversation's sake, I am trying to quote to you sufficient for this little dialogue.

One of the points that he makes on possible alternatives. They analyze the whole thing about the future combat system and the knowledge system, whether we are going to be able to get up to speed, and so on and so forth.

When he comes to the end of his presentation on defense acquisition, he said, "perhaps we could focus on maturing the most critical technologies first"—and this is in the context of the conversation you just had with the chairman—"focus on the maturing of the most critical technologies first, then bundle them in demonstrations of capabilities such as the Advanced Concept Technology demonstrations."

He uses that as the example, and defines that as follows: "Advanced technology demonstrations are used to demonstrate the maturity and potential of advanced technologies for enhanced military operational capability, or cost effectiveness, and reduced technical risks and uncertainties at the relatively low costs of informal processes."

Now, I know that is a long sentence, but it makes sense, and you can—as you follow it along. And in a sense, I take it from the dem-

onstration you were using that I missed, but I take it that what you did was try to show, pretty much along those lines.

How do you show a more mature technology that addresses at relatively low cost, a highly—an increased capability of being able to carry out missions. And you were able to do it without—to an informal process, if you will, of flexibility and utilization of that technology. Is that a fair—

General GRIFFIN. Yes, sir.

Mr. ABERCROMBIE [continuing]. Summary of that kind of thing?

General GRIFFIN. Yes, sir.

Mr. ABERCROMBIE. Well, if that is the case, then, here is where I find a difficulty. And I don't think you can answer it.

Obviously, you have to have some politics behind this that are worthy of the mission. And that is where the argument comes in.

In your testimony, general, about the Blue Force Tracker, and trying to deal with the unexploded—explosive devices—and the random attacks kind of thing, this has to do with the context of the political—in other words, that military situation is likely to take place in the asymmetrical warfare kind of idea that I expressed before. You said you sat through all of that conversation before with the previous panels.

My point here is, does it make more sense for you to engage in this kind of activity, which I think, from a cost point of view, a dollar point of view, is manageable by us, from a technological, innovation and flexibility point of view as manageable by you, and allows you to address the kind of circumstance that we meet?

These aren't grand armies meeting in big, huge venues. This isn't Spartacus meeting on the plain somewhere with the Roman legions.

Your Blue Force Tracker example that you are using is small group dynamics. It involves situation which, by definition, require almost instantaneous decision making in contexts that can't be anticipated very well by the people who run into them, expect in the most generalized kind of idea.

So is this where we need to go, rather than this grand scheme, this grand, exotic, technological leap, which I am more and more thinking is not necessarily taking where either of you have to go. And I see you as front-line, literally, exponents of whatever political policies have put you into that situation.

General GRIFFIN. Sir, the FCS is the future. And we talk about spiral development.

Mr. ABERCROMBIE. Yes.

General GRIFFIN. As a division commander at the 4th Division, we feel that FBCB2 to the division. And what FBCB2 allows you to do is that the individual platform, and then, in the future, at the individual themselves, allows you to know where you are and where your buddy is, and then, whereas, to the extent that you can put the red feed in, where the enemy is.

So whether you are on a block, on the street in Baghdad, or whether you are in the middle of the desert at the National Training Center, it can be zero light, 2 o'clock in the morning, and you know where you are, because you have an icon. Not only that, you know where the other folks are.

Now, that allows you to operate much more decentralized. This asymmetric threat that you talk about that can be from any direction. So as you do your decentralize, and the front is in the rear and vice versa, you are just as likely to get attacked from your flanks or your rear, or in the center.

So especially in a—whether it is an unconventional way, you are in a peacekeeping operation, whether you are in Baghdad or wherever you are, conventional, that Blue Force Tracking, we call it, the FBCB2, that gives you situational awareness, situational understanding. It allows you very rapidly to transmit that information.

Now, that is technology that, when we start talking about Future Combat System, we very quickly talk about the network.

So if we talk about the question that was asked earlier, how do you, what are you doing for the tanks and the Bradleys and the trucks as you go on to modernization, the network is one of those key things.

So as we develop the technology for the Future Combat System, and we spiral development, spiral it back into the current force, that means in 2015 or 2012 or 2020, when I have got the latest tank or whatever version of the tank and the Bradley and the Stryker, and whatever the FCS looks like, and in the air systems, we can all communicate through that network.

Mr. ABERCROMBIE. But excuse me, General, because the hour is late and the chairman is kindly letting me work this through, I understand all that. And I don't dispute that.

I think where the chairman's difficulty is and probably mine, in trying to make the proper recommendation, is that—but do we really need to concentrate on that kind of leap? And is it really necessary, as opposed to what you are probably going to have to deal with right now?

Let me give you a concrete example, no pun intended. I am working right now to figure out just exactly what do we need to do by way of funding. And what can I tell the chairman, and subsequently, the appropriators?

What do we need to do to provide the proper training ground for the Stryker Brigade in Hawaii—

General GRIFFIN. Yes, sir.

Mr. ABERCROMBIE [continuing]. At Scofield, to meet all the environmental standards to keep us from going into court, to understand what it precisely is needed, considering that the Stryker has already gone through a couple of these phases, is already spiraling?

I mean, I have seen it with my own eyes. I know exactly what is taking place. And I approve of it, and I see what is going on.

General GRIFFIN. Good example. Yes, sir.

Mr. ABERCROMBIE. We have got to do training at Pohakuloa on the Big Island. But there is money involved. I have got to have specific figures. I have got to be able to tell them. And I am trying to think 10 and 15 and 20 years down the line. I can draw you a parallel to the Navy at Barking Sands, at the Pacific missile testing range over there, of trying to think clearly 20 years ahead, if possible, to provide an infrastructure to allow for that kind of spiral flexibility, to be able to meet the needs.

But I don't want to confuse myself with then undermining the capacity of today's Army or Marine Corps or Navy to be able to

carry out its missions in those elements and areas that it is likely to find itself in the next five years or ten years.

General GRIFFIN. Sir, the way I view the Future Combat System, and it really gets back to some of the things Mr. Cooper mentioned, we provide a vehicle that is lighter, that has the protection, that has a better source of energy use, whether it is hybrid electric or whatever it is. It reduces the weight, it provides a better armor protection, it has a different weapons system on it.

It allows me to do those, to fight that asymmetric fight that you talked about, decentralized type operations. It allows me to project that force much more rapidly. Or it allows, wherever it is in the world, it allows me to get it there faster.

It really gets at, how do we do the things that we just talked about? And what does the future look like? And in my mind, that is the FCS. So whether it is a network—

Mr. ABERCROMBIE. Oh, I know, in general. But we have got to know in this budget the next steps you are going to take to make sure that that individual soldier knows where the person is next to him, the things that you outlined. That we can concentrate on.

General GRIFFIN. So that FCS piece is, how do we—and we are using that research development, RDT&E. And that really—

Mr. ABERCROMBIE. Okay.

General GRIFFIN [continuing]. That is where we are—that is what we are all about in the early years with respect to the FCS.

Mr. ABERCROMBIE. Okay. I appreciate it. Thank you very much for the time, Mr. Chairman. I am grateful.

Mr. SCHROCK [presiding]. Thank you, Mr. Abercrombie. Let me just follow up with one more question.

I share a lot of the frustrations of Mr. Abercrombie, and I think you all do, too, but the bottom line is, is the Army procurement process the best vehicle to meet these urgent requirements? Or would a specialized process or a specialized office somewhere to meet these urgent industrial capacity requirements be a better mix for this?

Has it gotten so involved in the political process that nothing can get done quickly? Or what would be your take on that?

General GRIFFIN. Sir, I go back to your comment on General Schoomaker—

Mr. SCHROCK. All right.

General GRIFFIN [continuing]. And his focused areas, his 17 focused areas, and zero backing on many of the questions that this panel has asked.

Now, I am not a procurement person, but I think we have a good system in place today to ask the tough questions, and whether that be a Defense Acquisition Board (DAB) that is coming up in November, or through that process.

And I think we have got the right leadership to challenge both inside the headquarters as well as in the field, to challenge that development process, if you will, that technology. And you know we are wrestling with the current as well as the future, and as we move along the axis that the chief talks about, going from the current force to the future force.

So I would say, based upon my experience and from where I sit, we have a good system in place, and we have got a leadership that

is committed to trying to balance that. And what I am most encouraged is, we talk about spiraling into that current force, that technology, whether it is the Bradley, the tank, the Stryker, the light infantry, the airborne, as we move to that FCS.

And back to what Joe Yakovac said earlier, you know, the first unit of action we are looking at is in 2012. That is really a brigade-sized element.

So the key is for the Army is the rest of that force, and as we go along this process, how we modernize and keep that force trained and ready, and try to meet as best we can those current requirements as we go down this road to FCS.

Mr. SCHROCK. I understand that as we go from 2010 and beyond, but I am looking at the current situation.

General GRIFFIN. Yes, sir.

Mr. SCHROCK. Is the procurement process adequate to get the gear the men and women need to wear or the hardening of the vehicles? Is that procurement process messed up?

General GRIFFIN. Okay, sir, I understand the question.

I think one of the most impressive things that I have watched is the Rapid Fielding Initiative, and that is the sheet, that is the helmet to the boots, clothing. That is a very aggressive process, and it is working very well. We are ramping to this production of the 25,000. The Chief has given us the task of within 2 years the entire 840,000 force will have the body armor.

There are innovative ideas that FCS is driving with respect to a lighter protective material that is being worked today. I saw some of it last week, and we are doing as much of that as we can.

I would say, from a procurement standpoint, sir, we are very aggressive with respect to trying to get that equipment there. But we are wrestling with the resources, as you mentioned.

Mr. SCHROCK. Sure. You want to comment?

General HANLON. Yes, sir. In fact, I was just talking to General Catto, my systems commander here, who deals with this literally every day.

The system we have in the Marine Corps, sir, we call it the Urgent UNS process. It is a very fast-moving system for identifying current urgent needs that the force needs. We used it extensively last year for the main operations in Iraq, and we are using it again.

It is working very well for us. I mean, like anything else, every now and then, if there is something we are trying to buy a lot of and the Army is trying to buy a lot of, and there is one guy making it, or one or two companies making it, then you always have to deal with production capability. I have to sit down with Ben and work out a fair share on that.

But for the system itself, sir, I think it works very well. In fact, Bill, you were mentioning we are at 25,000 of these, is that right, of the side pads? And we got 5,000, how quickly?

General CATTO. In six weeks.

General HANLON. Six weeks, and the other 20,000?

General CATTO. Mid-day.

General HANLON. By mid-May. So that is pretty quick, sir. I mean, that is actually pretty fast.

Mr. SCHROCK. What the captain was wearing, was that an innovation that was created after we went into Iraq? Or was it——

General HANLON. Yes, sir.

Mr. SCHROCK. After.

General HANLON. Yes, sir. It was a lesson learned. It was a pull-down lesson learned. Yes, sir.

Mr. SCHROCK. That was the follow-up, I guess, of what Mr. Cooper was asking. We knew we were going to go into the situation. Why didn't our troops have it at the same time? But if some of it was developed in the process of, I can understand that.

I think that is what we are all concerned with, that these young men and women don't have what they need when they go in there. And frankly, I think we are as guilty, if that is happening, as anybody.

We want to be here to help with that process. And I believe that is what Mr. Cooper was saying. And I am guessing if he goes to Iraq again and finds someone that doesn't have one, we will be hearing about it again.

General HANLON. I guarantee you, sir, there will always be some Marine out there that won't be wearing his helmet the day you walk up. I just guarantee it.

Mr. SCHROCK. Sure.

General HANLON. He should have it in his kit somewhere, I will tell you.

Mr. SCHROCK. I am sure.

Mr. Cooper.

Mr. COOPER. If the chairman yields, for just one quick question.

I think you said, General Hanlon, in response to the question, the Marines are pretty well outfitted now with SAPI plates and up-armored Humvees. Do you have any extras you could share with the Army, if they are short, and you have already met your requirements?

General CATTO. Congressman, the question is, if we are asked for it and we have it, we are going to supply it.

Mr. COOPER. If you are asked for it.

General CATTO. If we are asked for an item and we have it, we are going to supply it. This is a joint fight.

Mr. COOPER. Has the Army asked for any surplus that may be available?

General GRIFFIN. Sir, we will take surplus from anyone. We have actually, we have just gotten, I think, 150 from the Air Force.

Mr. COOPER. Would you ask General Hanlon right now if he has any surplus?

General GRIFFIN. Oh, yes, sir. You got any extras, I will take them right now, for sure.

Mr. COOPER. We need to make sure there is sharing here. People shouldn't wait to be asked. They should volunteer this.

General HANLON. Yes, sir. And, sir, I assure you that there is a lot of that that goes on day to day. I mean, when we got into——

Mr. COOPER. It is called "come show," all right?

General HANLON. When we got into the issue of up-armored Humvees, getting Army RL kit, we would not have gotten into that buy had the Army not made it possible for us, sir.

General GRIFFIN. Sir, we have a weekly VTC with the theater. And at that VTC is someone from this ops group. As the Marines prepared to go into Iraq, we discussed requirements that the Marine Corps had where the Army could help and vice versa, whether that was in body armor or protected vehicles.

Much of his testing for his material, I think is done in Aberdeen, right alongside with the Army. So there is lots of sharing here between the Army and the Marine Corps. To include, in his testimony he mentioned, say, an Army-Marine Corps board that we host about once every three weeks, and across the board how we can share information.

Just recently, he had a capability in Afghanistan, which we found out about and we immediately got on the classified net and talked to our folks in Afghanistan and were able to take advantage of that. So there is sharing between the Army and the Marine Corps here, as well as the Air Force, sir, and the Navy.

Mr. SCHROCK. Well, General Griffin, General Hanlon, thank you very much for being here. You can see how interested this subcommittee, and I assure you, the full committee is, because this is a topic of great debate here on the Hill. And I am sure we will be, and I am sure there will be other times we are going to want to visit with you all.

We appreciate your time today and——

General GRIFFIN. Sir.

Mr. SCHROCK [continuing]. Look forward to seeing you again. Thank you very much. This hearing is adjourned.

General GRIFFIN. Thank you, sir.

General HANLON. Thank you, Mr. Chairman.

[Whereupon, at 4:31 p.m., the subcommittee was adjourned.]

A P P E N D I X

APRIL 1, 2004

PREPARED STATEMENTS SUBMITTED FOR THE RECORD

APRIL 1, 2004

Statement of the Honorable Curt Weldon
Chairman, Subcommittee on Tactical Air and Land Forces

FY 2005 Land Component Budget Request

April 1, 2004

The Subcommittee will come to order.

This afternoon the Tactical Air and Land Forces Subcommittee meets to receive testimony on the land component and related programs in the Fiscal Year 2005 budget request. We have two panels of witnesses: For the first panel the General Accounting Office and the Department of the Army will provide the Subcommittee with their views on the Future Combat Systems program. During the second panel, representatives of the Departments of the Army and the United States Marine Corps will provide us with testimony on force protection, unfunded requirements associated with equipping our forces and sustainment of the current force into the future.

I've maintained through the years, first as Chairman of the

R&D Subcommittee, again as Chairman of the Military Procurement Subcommittee, and now today that the proposed defense budgets were insufficient to adequately fund the programs included in the budget requests. The GAO, concluded in 2003 that the current Army heavy force would be required to remain in the inventory through at least 2020. In order to extend our current capability to 2020, this force would need to be maintained and upgraded. The funding to support the current force would require significant investment. Our past experience indicates that the current force is constantly short changed by ever escalating cost growth in development programs.

Maintaining current equipment is the major challenge. It is our responsibility to make sure that we do not sacrifice today the capabilities and equipment provided to our soldiers in order to field a capability two decades from now.

The Future Combat Systems is the Army's flagship of transformation. As envisioned, FCS would allow the Army to rapidly deploy and operate in all types of military operations,

ranging from small-scale contingencies to major theater wars.

The technological and organizational advances that FCS promises would keep the Army well ahead of near-peer threats for decades.

The FCS program has a number of progressive features. The “system of systems” architecture within which individual systems will be developed is a dramatic improvement over the past practice of designing separate systems and then making these systems interoperable after the fact.

Another progressive feature is the collaborative environment in which the Army program management, the contractor, and the war-fighter community are developing the FCS requirements.

Finally, FCS accounts for lethality, survivability, and sustainability as equally important key performance characteristics at the inception of the program.

Unfortunately, the Future Combat Systems program also carries very high risks. The Army has never managed any program the size and complexity of FCS: 18 systems, 32 critical technology areas, 34 million lines of code, 129 trade studies, 157 essential

programs being developed independent of FCS, and all in 5 ½ years. FCS will cost at least \$22 billion through 2009 and \$92 billion through the fielding first 15 Units of Action. The software task alone is five times larger than that required for the Joint Strike Fighter and ten times larger than the F/A-22, which after two decades is finally meeting its software requirements.

If FCS experiences the technical difficulties that every major development program seems to experience, the cost overruns will consume the Army's budget. If Comanche, Crusader, or F-22 are portents of the magnitude of the problems, then FCS R&D could cost \$30 to \$40 billion. Can DOD or the Army afford such an investment? We do not want to be here in two years rebaselining FCS.

Let us consider the long-term and the overall DOD budget. CBO projects an approximate 30 percent shortfall in required funding to execute the long term defense plan. Given the overall national fiscal realities, the question is: "How do we reduce the risk in developing FCS so that we can afford to provide funding for

FCS without sacrificing the current force?” We need FCS to be successful.

I do want to commend the Army for facilitating transparent, pro-active congressional oversight on cost, schedule, and technical risk from the inception of the program.

We look forward to hearing from our panels about this program of the future and about meeting the needs of our soldiers and marines today as they fight the Global War on Terror.

We have two panels here with us today. On the first panel:

Representing the Army, Lieutenant General Joseph L. Yakovac, Jr., Military Deputy Director, Army Acquisition Corps and representing the General Accounting Office, Mr. Paul L. Francis, Director of Acquisition Sourcing Management.

Our second panel, testifying on force protection and sustaining the current force will be:

Lieutenant General Benjamin S. Griffin, Deputy Chief of Staff, G-8, United States Army and Lieutenant General Edward Hanlon, Jr. Deputy Commandant, Marine Corps Combat Development Command.

Thank you to all of our witnesses for joining us. We look forward to your testimony.

United States General Accounting Office

GAO

Testimony

Before the Subcommittee on Tactical Air
and Land Forces, Committee on Armed
Services, House of Representatives

For Release on Delivery
Expected at 1:00 p.m. EST
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DEFENSE ACQUISITIONS

The Army's Future Combat Systems' Features, Risks, and Alternatives

Statement of Paul L. Francis, Director,
Acquisition and Sourcing Management



GAO-04-635T

April 1, 2004



Highlights of GAO-04-635T, a testimony before the Subcommittee on Tactical Air and Land Forces, Committee on Armed Services, House of Representatives

DEFENSE ACQUISITIONS

The Army's Future Combat Systems' Features, Risks, and Alternatives

Why GAO Did This Study

To become a more responsive and dominant combat force, the U.S. Army is changing its strategy from bigger and stronger weapons to faster and more agile ones. The Future Combat Systems (FCS)—which the Army calls the “greatest technology and integration challenge ever undertaken”—is expected to meet the Army's transformational objectives. Forming FCS' backbone is an information network that links 18 systems. Not only is FCS to play a pivotal role in the Army's military operations, FCS and its future iterations are expected to eventually replace most of the Army forces. For FCS' first developmental increment, the Army has set aside a 5 ½-year timetable from program start (May 2003) until the initial production decision (November 2008).

GAO was asked to testify about FCS' key features, whether the program carries any risks, and, if so, whether there are alternatives for developing FCS capabilities with fewer risks.

What GAO Found

The FCS concept is a new generation of manned and unmanned ground vehicles, air vehicles, and munitions, each of which taps into a secure network of superior combat information. These weapon systems are to be a fraction of the weight of current weapons yet as lethal and survivable. FCS' lightweight and small size are critical to meeting the Army's goals of deploying faster and being more transportable for big or small military operations. Rather than rely on heavy armor to withstand an enemy attack, FCS' systems will depend on superior communications to kill the enemy before being detected. One of FCS' key advantages is that it provides an architecture within which individual systems will be designed—an improvement over designing systems independently and making them interoperable after the fact. Another merit is that FCS is being acquired and developed with the full cooperation of the Army's program managers, contractors, and the warfighter community.

FCS is at significant risk for not delivering required capability within budgeted resources. Three-fourths of FCS' needed technologies were still immature when the program started. The first prototypes of FCS will not be delivered until just before the production decision. Full demonstration of FCS' ability to work as an overarching system will not occur until after production has begun. This demonstration assumes complete success—including delivery and integration of numerous complementary systems that are not inherently a part of FCS but are essential for FCS to work as a whole. When taking into account the lessons learned from commercial best practices and the experiences of past programs, the FCS strategy is likely to result in cost and schedule consequences if problems are discovered late in development.

Because it is promising to deliver unprecedented performance capabilities to the warfighter community, the Army has little choice but to meet a very high standard and has limited flexibility in cutting FCS requirements. Because the cost already dominates its investment budget, the Army may find it difficult to find other programs to cut in order to further fund FCS. To avoid unanticipated cost and schedule problems late in development, several alternatives can be considered:

- add time to FCS' acquisition schedule to reduce concurrent development;
- take the time to develop and demonstrate the most critical capabilities first, such as the FCS network, then proceed with an acquisition program; and
- focus on maturing the most critical technologies first, then bundle them in demonstrations of capabilities, and ensure that decision makers have attained the knowledge they need at critical junctures before moving forward.

www.gao.gov/cgi-bin/gettr?GAO-04-635T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Paul L. Francis at (202) 512-4841 or plfrancis@gao.gov.

Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today to discuss the Department of the Army's Future Combat Systems (FCS), a networked suite of weapons and other systems. FCS is the centerpiece of the Army's plan to transform to a lighter, more agile, and more capable force. The Army plans to develop and field FCS in increments, but has only defined the first increment at this time. Increment 1 of FCS began system development and demonstration in May 2003. The production decision is currently planned for November 2008 and initial operational capability is slated for December 2010. This first increment will equip 15 brigade-sized Units of Action by 2020—about one third of the active force. Total costs to develop and produce Increment 1 are estimated at \$92 billion, in then year dollars. The fiscal year 2004 budget provides \$1.7 billion in research and development funds for FCS; the fiscal year 2005 budget requests a substantial increase to \$3.2 billion.

Today I would like to cover (1) the features of the FCS concept, (2) the prospects for delivering a capable FCS within budgeted cost and schedule, and (3) whether alternatives to the current FCS strategy are worth considering.

Summary

FCS is an information network linking a suite of 18 new manned and unmanned ground vehicles, air vehicles, sensors, and munitions. They are to be a fraction of the weight of current weapons, yet are to be as lethal and survivable. Their lightweight and small size are critical to meeting the other goals of the Army's future force: better responsiveness and enhanced sustainability. At a fundamental level, the FCS concept is replacing mass with superior information; that is, to see and hit the enemy first, rather than to rely on heavy armor to withstand an attack. The ability to make this leap depends on (1) the ability of the network to collect, process, and deliver vast amounts of information such as imagery and communications and (2) the performance of the individual systems themselves. This concept has a number of progressive features. It provides an architecture within which individual systems will be designed—an improvement over designing systems independently and making them interoperable after the fact. It includes sustainability as a design characteristic versus an afterthought. It has galvanized relationships between users and developers. It also shows a willingness on the part of Army leaders not to be bound by tradition.

FCS is at significant risk for not delivering required capability within budgeted resources. At conflict are the program's unprecedented technical challenges and time. At a top level, the technical challenges are: development of a first-of-a-kind network, 18 advanced systems, 53 critical technologies, 157 complementary systems, and 34 million lines of software code. From a time standpoint, the Army allows only 5 ½ years between program start and the production decision. This is faster than it has taken to develop a single major system, and FCS has several systems including the network, an Abrams replacement, a Bradley replacement, and a Crusader replacement. To meet this timetable, FCS is proceeding on a highly concurrent strategy that started with over 75 percent of critical technologies immature. Assuming everything goes as planned, the FCS program will begin production before all of its systems have been demonstrated. If all FCS elements are not ready at the production decision, Army plans still call for going forward with production and fielding. Based on the lessons learned from best practices and the experiences of past programs, FCS is susceptible to discovering costly problems in late development and early production, as the demonstration of multiple technologies, individual systems, the network, and the system of systems will all culminate.

Alternatives to the current FCS strategy are worth considering in light of these risks. The tools normally employed to accommodate problems in weapon systems—relaxing performance requirements and adding funds—may not be available to the FCS program. The opportunity for making performance trade-offs on FCS is limited by the fact that it must be transportable by the C-130 aircraft yet be as lethal and survivable as the current force. On the funding side, the \$92 billion cost estimate only allows for 14 of the 18 systems to be acquired, despite being based on an immature program and assuming full success in development. A modest delay late in development could cost \$5 billion; a similarly modest 10-percent increase in production cost would amount to \$7 billion. Providing more money on this scale after problems have occurred may not be feasible given the fiscal pressures the government in general—and DOD in particular—faces. Several alternatives that would enable a less concurrent—and more predictable—strategy are possible, if acted upon early. Alternatives should have several things in common: building more knowledge before commitments like production are made; preserving the advantages of the FCS concept, such as defining an architecture to guide the design of individual systems; and the ability to spin off mature technologies to existing systems.

Army Transformation and the FCS Program

The Army plans to develop and acquire FCS in at least two increments but, according to program officials, only the first one has been defined at this point. The first increment is an information network linking a new generation of 18 manned and unmanned ground vehicles, air vehicles, sensors, and munitions. The manned ground vehicles are to be a fraction of the weight of current weapons such as the Abrams tank and Bradley Fighting Vehicle, yet are to be as lethal and survivable. At a fundamental level, the FCS concept is replacing mass with superior information; that is, to see and hit the enemy first, rather than to rely on heavy armor to withstand attack. The ability to make this leap depends on (1) the ability of the network to collect, process, and deliver vast amounts of information such as imagery and communications and (2) the performance of the individual systems themselves. The concept has a number of progressive features. For example, it provides an architecture within which individual systems will be designed—an improvement over designing systems independently and making them interoperable after the fact.

Army Transformation

A decade after the cold war ended, the Army recognized that its combat force was not well suited to perform the operations it faces today and is likely to face in the future. The Army's heavy forces had the necessary firepower but required extensive support and too much time to deploy. Its light forces could deploy rapidly but lacked firepower. To address this mismatch, the Army decided to radically transform itself into a new "Future Force."

The Army expects the Future Force to be organized, manned, equipped, and trained for prompt and sustained land combat, requiring a responsive, technologically advanced, and versatile force. These qualities are intended to ensure the Future Force's long-term dominance over evolving, sophisticated threats. The Future Force will be offensively oriented and will employ revolutionary operational concepts, enabled by new technology. This force will fight very differently than the Army has in the past, using easily transportable lightweight vehicles, rather than traditional heavily armored vehicles.¹ A key characteristic of this force is agility. Agile forces would possess the ability to seamlessly and quickly transition among various types of operations from support operations to warfighting and back again. They would adapt faster than the enemy, thereby denying

¹ As an interim step toward transformation, the Army is organizing medium weight, rapidly deployable brigades around 19-ton Stryker armored vehicles.

it the initiative. In an agile force, commanders of small units may not have the time to wait on higher command levels; they must have the authority and high quality information at their level to act quickly to respond to dynamic situations.

Thus, to be successful, the transformation must include more than new weapons. The transformation is extensive, encompassing tactics and doctrine, as well as the very culture and organization of the Army.

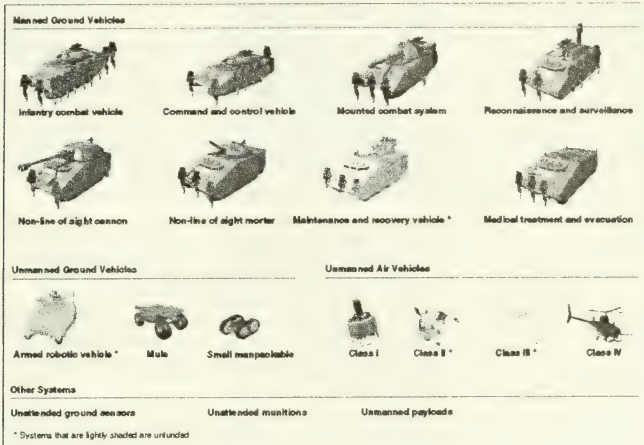
Against that backdrop, today, I will focus primarily on the equipment element of the transformation, represented by FCS.

The FCS Solution

FCS will provide the majority of weapons and sensor platforms that comprise the new brigade-like modular units of the Future Force known as Units of Action. Each unit is to be a rapidly deployable fighting organization about the size of a current Army brigade but with the combat power and lethality of a current (larger) division. The Army also expects FCS-equipped Units of Action to provide significant war-fighting capabilities to the Joint Force.

The first FCS increment will ultimately be comprised of an information network and 18 various systems—which can be characterized as manned ground systems, unmanned ground systems, and unmanned air vehicles. While some systems will play a larger role in the network than others, the network will reside in all 18 systems, providing information to them as well as taking information from them. Figure 1 shows FCS Increment 1.

Figure 1: Basic Composition of FCS Increment 1



Source: U.S. Army

The Joint Tactical Radio System and the Warfighter Information Network-Tactical are two programs outside of FCS that integrate all the various systems and soldiers together. As such, their development is crucial to the FCS network. The communications backbone of the Unit of Action will be a multi-layered mobile network centered on the Joint Tactical Radio System. According to program officials, all soldiers and FCS vehicles, including the unmanned vehicles, will employ these radios. Beyond being the primary communications component within the unit, the Joint Tactical Radio System also will assist with communications beyond the unit, to assets at higher echelons. Communications with those

echelons will be enabled through the Warfighter Information Network-Tactical, which provides the overarching network background for the FCS network and is expected to conform to DOD's interoperability and network architecture directives.

Increment 1 began system development and demonstration in May 2003. Currently, only the network and 14 systems are funded. The remaining 4 systems will be introduced as funding becomes available. Current estimates are for the acquisition of Increment 1 to cost \$92 billion (then-year dollars) and to achieve an initial operational capability by the end of 2010. Although the Under Secretary of Defense approved the Army's request to begin the system development and demonstration phase, he directed the Army to prepare for a full program review in November 2004. Increment 1 is expected to replace roughly one-third of the active force through about 2020, when the first 15 Units of Action are fielded.

According to program officials, the Army has not yet defined future FCS increments. However, it is important to note that the Army expects to eventually replace most of its current forces with the FCS. Much of the current Army heavy force is expected to remain in the inventory—needing to be maintained and upgraded—through at least 2020. We recently reported⁷ that costs of maintaining legacy systems would be significant, but funding is likely to be extremely limited, particularly given competition for funds from transformation efforts. We concluded that maintaining legacy equipment will likely be a major challenge, necessitating funding priorities to be more clearly linked to needed capability and to long-range program strategies.

The Army intends to employ a single Lead Systems Integrator throughout the completion of Increment 1. The Lead System Integrator will be the single accountable, responsible contractor to integrate FCS on time and within budget. It will act on behalf of the Army throughout the life of the program to optimize the FCS capability, maximize competition, ensure interoperability, and maintain commonality in order to reduce life-cycle cost. In order to quickly transition into system development and demonstration and to manage the multitude of tasks associated with FCS

⁷ See U.S. General Accounting Office, *Military Readiness: DOD Needs to Reassess Program Strategy, Funding Priorities, and Risks for Selected Equipment*, GAO-04-112 (Washington, D.C., Dec. 19, 2003).

acquisition, the Army chose the Lead System Integrator approach to capitalize on industry's flexibility.

The Requirements Challenge

The Army wants the FCS-equipped Unit of Action to have a number of features. These can be described in four characteristics: lethality, survivability, responsiveness, and sustainability. The Unit of Action is to be as lethal as the current heavy force. It must have the capability to address the combat situation, set conditions, maneuver to positions of advantage, and close with and destroy enemy formations at longer ranges and greater precision than the current force. To provide this level of lethality and reduce the risk of detection, FCS must provide high single-shot effectiveness. To be as survivable as the current heavy force, the Unit of Action is primarily dependent upon the ability to kill the enemy before being detected. This depends on unit's ability to see first, understand first, act first, and finish decisively. The individual FCS systems will also rely on a layered system of protection involving several technologies that lowers the chances of a vehicle or other system being seen by the enemy; if seen, lowers the chances of being acquired; if acquired, lowers the chances of being hit; if hit, lowers the chances of being penetrated; and finally, if penetrated, increases the chances of surviving. To be responsive, Units of Action must be able to rapidly deploy anywhere in the world, be rapidly transportable via various transport modes, and be ready to fight upon arrival. To facilitate rapid transportability, FCS vehicles are being designed to match the weight and size constraints of the C-130 aircraft. The Unit of Action is to be capable of sustaining itself for periods of 3 to 7 days depending on the level of conflict. This sustainability requires subsystems with high reliability and low maintenance, reduced demand for fuel and water, highly effective offensive weapons, and a fuel-efficient engine.

Meeting all these requirements will be a difficult challenge because the solution to meet one requirement may work against another requirement. For example, the FCS vehicles' small size and lighter weight are factors that improve agility, responsiveness, and deployability. However, their lighter weight precludes the use of the traditional means to achieve survivability—heavy armor. Instead, the FCS program must use cutting-edge technology to develop systems, such as an active protection system, to achieve survivability. Yet such technology cannot be adopted if it impairs the new systems' reliability and maintainability. Weight, survivability, and reliability will have to be kept in balance.

Merits of the Concept

The essence of the FCS concept itself—to provide the lethality and survivability of the current heavy force with the sustainability and deployability of a force that weighs a fraction as much—has the intrinsic attraction of doing more with less. The concept has a number of merits, which demonstrate the Army's desire to be proactive in its approach to preparing for potential future conflicts and its willingness to break with tradition in developing an appropriate response to the changing scope of modern warfare.

- If successful, the architecture the program is developing will leverage individual capabilities of weapons and platforms and will facilitate interoperability and open systems. This architecture is a significant improvement over the traditional approach of building superior individual weapons that must be netted together after the fact. Also, the system of systems network and weapons could give acquisition managers the flexibility to make best value trade-offs across traditional program lines.
- This transformation of the Army, both in terms of operations and in equipment, is underway with the full cooperation of the Army warfighter community. In fact, the development and acquisition of FCS are being done using a collaborative relationship between the developer (program manager), the contractor, and the warfighter community. For example, the developer and the warfighter are using a disciplined approach to decompose the Unit of Action Organizational and Operational Plan and the FCS Operational Requirements Document into detailed specifications. This work is defining in detail the requirements for a Unit of Action to operate in a network-centric environment. This approach is in line with best practices to ensure that specific technical issues are understood before significant design work is done.³
- The Army has established sustainability as a design characteristic equal to lethality and survivability. This is an improvement over past programs, such as the Apache helicopter and the Abrams tank. These programs did not emphasize sustainability, to less than desirable results, including costly maintenance problems and low readiness rates, which persisted even after the systems were fielded. FCS' approach of emphasizing sustainability from the outset should allow operating and support costs and readiness to be evaluated early in development, when there is a

³ Over the past 8 years, we have completed a number of reviews of best practices for managing new product developments. For a broader discussion on best practices in relation to user or warfighter involvement, see U.S. General Accounting Office, *Best Practices: Better Matching of Needs and Resources Will Lead to Better Weapon System Outcomes*, GAO-01-288 (Washington, D.C., Mar. 8, 2001).

greater chance to affect those costs positively. This approach is also in line with best practices.⁴

FCS at Significant Risk of Not Delivering Required Capability Within Estimated Resources

The FCS program has yet to—and will not—demonstrate high levels of knowledge at key decision points. It thus carries significant risks for execution. At conflict are the program's technical challenges and limited time frame. The Army began system development and demonstration in May 2003 and plans to make its initial FCS production decision in November 2008—a schedule of about 5 ½ years. Seventy-five percent of the technologies were immature at the start of system development and demonstration and some will not be proven mature until after the scheduled initial production decision. First prototypes for all 14 funded systems and the network will not be demonstrated together until after the production decision and will serve both as technology demonstrators and system prototypes. They will represent the highest level of FCS demonstration before production units are delivered, as no production-representative prototypes are planned. Even this level of demonstration assumes complete success in maturing the technologies, developing the software, and integrating the systems—as well as the delivery and integration of the complementary systems outside of FCS. While the Army is embarking on an impressive array of modeling, simulation, emulation, and other demonstration techniques, actual demonstration of end items is the real proof, particularly for a revolutionary advance, such as FCS.

If the lessons learned from best practices and the experiences of past programs have any bearing, the FCS strategy is susceptible to "late cycle churn," a phrase used by private industry to describe the discovery of significant problems late in development and the attendant search for fixes when costs are high and time is short. FCS is susceptible to this kind of experience as the demonstration of multiple technologies, individual systems, the network, and the system of systems will all culminate late in development and early production.

FCS Is an Unprecedented Technical Challenge

In the Army's own words, FCS is "the greatest technology and integration challenge the Army has ever undertaken." It intends to develop a complex,

⁴ See U.S. General Accounting Office, *Best Practices: Setting Requirements Differently Could Reduce Weapon Systems' Total Ownership Costs*, GAO-03-57 (Washington, D.C.: Feb. 11, 2003).

family of systems—an extensive information network and 14 major weapon systems—in less time than is typically taken to develop, demonstrate, and field a single system. The FCS Acquisition Strategy Report describes this scenario as a “dramatically reduced program schedule (which) introduces an unprecedented level of concurrency.” Underscoring that assessment is the sheer scope of the technological leap required for the FCS. For example:

- A first-of-a-kind network will have to be developed.
- The 14 major weapon systems or platforms have to be designed and integrated simultaneously and within strict size and weight limitations.
- At least 53 technologies that are considered critical to achieving critical performance capabilities will need to be matured and integrated into the system of systems.
- The development, demonstration, and production of as many as 157 complementary systems will need to be synchronized with FCS content and schedule. This will also involve developing about 100 network interfaces so the FCS can be interoperable with other Army and joint forces.
- An estimated 34 million lines of software code will need to be generated (5 times that of the Joint Strike Fighter, which had been the largest defense undertaking in terms of software to be developed).

Some of these technical challenges are discussed below.

Network Development Challenges

The overall FCS capabilities are heavily dependent on a high quality of service—good information, delivered fast and reliable—from the network. However, the Army is proceeding with development of the entire FCS system of systems before demonstrating that the network will deliver as expected. Many developmental efforts will need to be successful for the network to perform as expected. For each effort, a product—whether software or hardware—must first be delivered and then demonstrated individually and collectively. The success of these efforts is essential to the high quality of service the network must provide to each Unit of Action. In some cases, an individual technology may be a linchpin—that is, if it does not work, the network’s performance may be unacceptable. In other cases, lower than expected performance across a number of individual technologies could collectively degrade network performance below acceptable levels. Some key challenges are highlighted below:

- System of Systems Common Operating Environment is a software layer that enables interoperability with external systems and manages the distribution of information and software applications across the

distributed network of FCS systems. According to program officials, the System of Systems Common Operating Environment is on the critical path for most FCS software development efforts.

- The Joint Tactical Radio System and the Warfighter Information Network-Tactical, and several new wideband waveforms—all in development—are essential to the operation of the FCS network. It is vital that these complementary developments be available in a timely manner for the currently planned demonstrations of the network.
- The information-centric nature of FCS operations will require a great deal of bandwidth to allow large amounts of information to be transmitted across the wireless network. However, the radio frequency spectrum is a finite resource, and there is a great deal of competition and demand for it. An internal study revealed that FCS bandwidth demand was 10 times greater than what was actually available. As a result, the program initiated a series of trade studies to examine and reassess bandwidth requirements of various FCS assets. The results of these studies may have a dramatic effect on the FCS network. The Army has already made a number of changes to the network design to use available bandwidth more efficiently and to reduce bandwidth demand.
- After determining that Unmanned Aerial Vehicle (UAV) sensor missions would constitute the largest consumption of network bandwidth, the Army started a new wideband waveform development effort, using the higher frequency bands. This effort will also require new updated Joint Tactical Radio System hardware and new antennas in addition to a new waveform.
- Sophisticated attackers could compromise the security of the FCS network, which is critical to the success of the system of systems concept. Such an attack could degrade the systems' war-fighting ability and jeopardize the security of Army soldiers. The Army is developing specialized protection techniques as there is only limited commercial or government software currently available that will adequately protect a mobile network like the one proposed for FCS.

UAV Development Challenges

FCS Increment 1 includes four classes of UAVs that cover increasing areas of responsibility. According to program officials, two of the UAV classes are currently unfunded and are currently not being developed. The Army plans to develop, produce and field them if funding becomes available. Within the FCS concept, UAV roles include reconnaissance, target acquisition and designation, mine detection, and wide-band communications relay. The required UAVs will need to be designed, developed, and demonstrated within the 5½-year period prior to the initial

Manned Ground Vehicle Development Challenges

FCS production decision. As we recently testified,⁷ DOD's experiences show that it is very difficult to field UAVs. Over the last 5 years, only three systems have matured to the point that they were able to use procurement funding.

FCS Increment 1 includes eight manned ground systems, however, one—the maintenance and recovery vehicle—is unfunded. The Army plans to use the Heavy Expanded Mobility Tactical Truck-Wrecker in its place in the Unit of Action. The remaining seven manned ground systems require critical individual and common technologies to meet required capabilities. For example, the Mounted Combat System will require, among other new technologies, a newly developed lightweight weapon for lethality; a hybrid electric drive system and a high-density engine for mobility; advanced armors, an active protection system, and advanced signature management systems for survivability; a Joint Tactical Radio System with the wideband waveform for communications and network connection; a computer-generated force system for training; and a water generation system for sustainability.

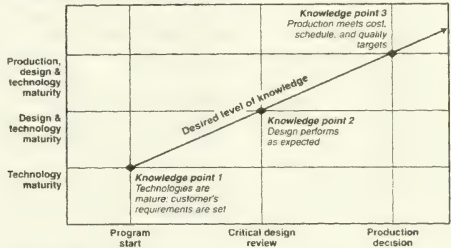
Under other circumstances, each of the seven manned ground systems would be a major acquisition program on par with the Army's past major ground systems such as the Abrams tank, the Bradley Fighting Vehicle, and the Crusader Artillery System. As such, each requires a major effort to develop, design, and demonstrate the individual vehicles. Recognizing that a number of subsystems will be common among the vehicles, meeting the Army's schedule will be a challenge as this effort must take place within the 5½-year period prior to the initial FCS production decision.

⁷ See U.S. General Accounting Office, *Unmanned Aerial Vehicles: Major Management Issues Facing DOD's Development and Fielding Efforts*, GAO-04-530T (Washington, D.C.: Mar. 17, 2004).

High Levels of Demonstrated Knowledge Are Key to Getting Desired Outcomes

We have found for a program to deliver a successful product within identified resources, managers should build high levels of demonstrated knowledge before significant commitments are made.³ Figure 2 depicts the key elements for building knowledge.

Figure 2: Best Practices Model Focuses on Three Critical Knowledge Points



Source: GAO (analyst).

This knowledge build, which takes place over the course of a program, can be broken down into three knowledge points to be attained at key junctures in the program:

- At knowledge point 1, the customer's needs should match the developer's available resources—mature technologies, time, and funding. This is

³See U.S. General Accounting Office, *Best Practices: Capturing Design and Manufacturing Knowledge Early Improves Acquisition Outcomes*, GAO-02-701 (Washington, D.C.: July 15, 2002); *Best Practices: Better Management of Technology Development Can Improve Weapon System Outcome*, GAO/NSIAD-99-162 (Washington, D.C.: July 30, 1999); and *Best Practices: Successful Application to Weapon Acquisition Requires Changes in DOD's Environment*, GAO/NSIAD-98-56 (Washington, D.C.: Feb. 24, 1998).

indicated by the demonstrated maturity of the technologies needed to meet customer needs.⁷

- At knowledge point 2, the product's design is stable and has demonstrated that it is capable of meeting performance requirements. This is indicated by the number of engineering drawings that are releasable to manufacturing.
- At knowledge point 3, the product must be producible within cost, schedule, and quality targets and have demonstrated its reliability. It is also the point at which the design must demonstrate that it performs as needed. Indicators include the number of production processes in statistical control.

The three knowledge points are related, in that a delay in attaining one delays those that follow. Thus, if the technologies needed to meet requirements are not mature, design and production maturity will be delayed. For this reason, the first knowledge point is the most important. DOD's acquisition policy has adopted the knowledge-based approach to acquisitions. Translating this approach to DOD's acquisition policy, a weapon system following best practices would achieve knowledge point 1 by the start of system development and demonstration, knowledge point 2 at critical design review (about halfway through development), and knowledge point 3 by the start of production.

For the most part, all three knowledge points are eventually attained on a completed product. The difference between highly successful product developments—those that deliver superior products within cost and schedule projections—and problematic product developments is how this knowledge is built and how early in the development cycle each knowledge point is attained. If a program is attaining the desired levels of knowledge, it has less risk—but not zero risk—of future problems. Likewise, if a program shows a gap between demonstrated knowledge and best practices, it indicates an increased risk—not a guarantee—of future problems. Typically, these problems cost more money than has been identified and take more time than has been planned.

DOD programs that have not attained these levels of knowledge have experienced cost increases and schedule delays. We have recently

⁷ Technology readiness levels are a way to measure the maturity of technology. Technology is considered sufficiently mature to start a program when it reaches a readiness level of 7. This involves a system prototype demonstration in an operational environment. The prototype is near or at the planned operational system.

reported on such experiences with the F/A-22, the Advanced SEAL Delivery System, the Airborne Laser, and the Space Based Infrared System High. For example, the technology and design matured late in the F/A-22 program and have contributed to numerous problems. Avionics have experienced major development problems and have driven large cost increases and caused testing delays.

**Even Assuming Success,
FCS Strategy Will Not
Demonstrate High Levels
of Knowledge**

The FCS program started system development and demonstration with significantly less knowledge than called for by best practices. This knowledge deficit is likely to delay the demonstration of subsequent design and production knowledge at later junctures and puts the program at risk of cost growth, schedule delays, and performance shortfalls. Two factors contributed to not having a match between resources and requirements at the start of system development and demonstration: 75 percent of critical technologies were not mature and requirements were not well defined. Later in the program, when the initial production decision is made, a knowledge gap will still exist even if the program proceeds on schedule. For example, prototypes of all 14 funded systems, the network, and the software version needed for initial operational capability will not be brought together and tested for the first time until after the production decision. Further, as production-representative prototypes will not be built, it does not appear that much demonstration of production process maturity can occur before the production decision.

**Knowledge Gap at Start of
System Development and
Demonstration**

Using best practices, at the start of system development and demonstration, a program's critical technologies should be demonstrated to a technology readiness level of 7. This means the technology should be in the form, fit, and function needed for the intended product and should be demonstrated in a realistic environment, such as on a surrogate platform. While DOD's policy states a preference for a technology readiness level of 7, it accepts a minimum of a level 6. According to program officials, technologies were accepted for FCS if they were at level 6 or if the Army determined that the technologies would reach a readiness level of 6 before the July 2006 critical design review. To put this discussion of technology maturity in perspective, the difficulties the F/A-22 fighter are currently experiencing with its avionics system are, in essence, the consequence of not demonstrating a technology readiness level of 7 until late in the program.

Consequently, the Army started FCS system development and demonstration phase with about 75 percent of its critical technologies below level 7, with many at level 5 and several at levels 3 and 4. Since then,

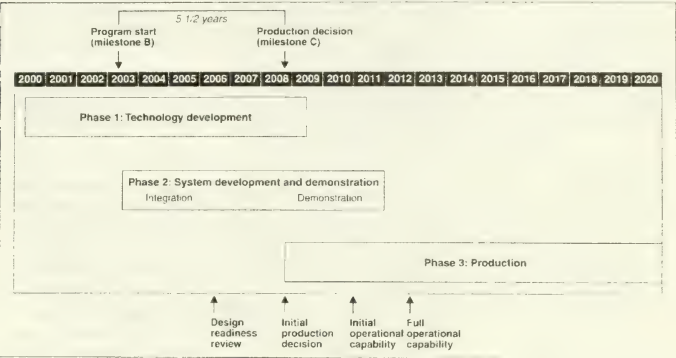
progress has been made, but the Army expects that, by the full program review in November 2004, only 58 percent of the program's critical technologies would be matured to a technology readiness level of 6 or higher. The Army estimates that 95 percent of the technologies will reach level 6 by the critical design review. The program does not expect all FCS critical technologies to be demonstrated to level 7 until mid-2009, after the initial production decision and about 6 years after the start of system development and demonstration.

The second factor keeping the Army from matching resources with customer's needs before starting the system development and demonstration phase was that it did not have an adequate definition of the FCS requirements. The program continues to work on defining the requirements for the FCS system of systems and the individual systems. System requirements may not be completely defined until at least the preliminary design review in April 2005 and, perhaps, as late as the critical design review in July 2006. The program still has a number of key design decisions to be made that will have major impacts on the FCS requirements and the conceptual design of FCS Increment 1. Currently, the program has 129 trade studies underway including 5 studies that are critical and due to be completed soon. For example, a critical study with great potential impact is determining the upper weight limit of the individual FCS manned platforms. This determination could affect the FCS transportability, lethality, survivability, sustainability, and responsiveness capabilities. These and other open questions on the FCS requirements will need to be answered in order for the detailed design work to proceed and ultimately to be stabilized at the critical design review.

**Demonstrated Knowledge Will
Be Low at Production Decision**

To go from system development and demonstration to production in 5 ½ years, the FCS program depends on a highly concurrent approach to developing technology, as well as to designing, building, testing, and producing systems. This level of concurrency resulted from the Army's establishment of 2010 as its target for initial operating capability for the first FCS Unit of Action. Army officials acknowledge that this is an ambitious date and that the program was not really ready for system development and demonstration when it was approved. However, the officials believe it was necessary to create "irreversible momentum" for the program. Army leaders viewed such momentum as necessary to change Army culture. The result is an accelerated schedule-driven program, as depicted in figure 3, rather than an event-driven program.

Figure 3: The FCS Acquisition Schedule Includes Periods of Concurrent Development



Source: U.S. Army.

Even if the program successfully completes this schedule, it will yield lower levels of demonstrated knowledge than suggested by best practices and DOD's acquisition policy. Significant commitments will thus be made to FCS production before requisite knowledge is available. For example:

- Technology development is expected to continue through the production decision.
- At the design readiness review (critical design review) in July 2006, technology development will still be ongoing, putting at risk the stability of ongoing system integration work.
- In December 2007, while technology development and system integration are continuing and first prototypes are being delivered, the Army plans to

begin long lead item procurement⁸ and to begin funding for the production facilities.

- In November 2008, the initial production decision is expected to be made. However, program officials said that some technologies will not have reached level 7 by that time, and the system of systems demonstration will remain to be done.
- In early 2010, as production deliveries have started, the Army plans to finish Integrated System Development and Demonstration Test Phase 5.1, the first full demonstration of all FCS components as an integrated system. Testing and demonstration will continue until the full rate production decision in mid-2013.
- The initial operational capability is planned for December 2010.

With the FCS concurrent strategy, much demonstration of knowledge will occur late in development and early in production, as technologies mature, prototypes are delivered, and the network and systems are brought together as a system of systems. This makes the program susceptible to "late cycle churn," a condition that we reported⁹ on in 2000. Late cycle churn is a phrase private industry has used to describe the efforts to fix a significant problem that is discovered late in a product's development. Often, it is a test that reveals the problem. The churn refers to the additional—and unanticipated—time, money, and effort that must be invested to overcome the problem. Problems are most devastating when they delay product delivery, increase product cost, or "escape" to the customer.

The discovery of problems in testing conducted late in development is a fairly common occurrence on DOD programs, as is the attendant late cycle churn. Often, tests of a full system, such as launching a missile or flying an aircraft, become the vehicles for discovering problems that could have been found earlier and corrected less expensively. When significant problems are revealed late in a weapon system's development, the reaction—or churn—can take several forms: extending schedules to increase the investment in more prototypes and testing, terminating the program, or redesigning and modifying weapons that have already made it

⁸ Long lead items are those components or a system or piece of equipment for which the times to design and fabricate are the longest, and therefore, to which an early commitment of funds may be desirable in order to meet the earliest possible date of system completion.

⁹ See U.S. General Accounting Office, *Best Practices: A More Constructive Approach is Key to Better Weapon System Outcomes*, GAO/NSIAD-00-199 (Washington, D.C.: July 31, 2000).

to the field. Over the years, we have reported numerous instances in which weapon system problems were discovered late in the development cycle.

The Army has embarked on an impressive plan to mitigate risk using modeling, simulation, emulation, hardware in the loop, and system integration laboratories throughout FCS development. This is a laudable approach designed to reduce the dependence on late testing to gain valuable information about design progress. However, on a first-of-a-kind system like FCS that represents a radical departure from current systems, actual testing of all the components integrated together is the final proof that the system works both as predicted and as needed.

If the FCS strategy does not deliver the system of systems as planned, the Army is still prepared to go forward with production and fielding. The Army's Acquisition Strategy Report states that at the Initial Production Decision, all elements of the FCS may not be ready for initial production and will require a continuation of system development and demonstration efforts to complete integration and testing in accordance with the program-tailoring plan. For those that need more time, FCS program manager will present to the Milestone Decision Authority a path forward, with supporting analysis. In addition, the Army will accept existing systems in lieu of actual FCS systems to reach initial operational capability.

Alternatives to FCS Strategy Merit Consideration

We have reported on options that warrant consideration as alternatives for developing FCS capabilities with less risk.¹⁰ Alternatives are still viable and worth considering, particularly before major funding and programmatic commitments are made. If the FCS program proceeds as planned and does experience problems later in development, it may pose a real dilemma for decision makers. Typically, performance, schedule, and cost problems on weapon system programs are accommodated by lowering requirements and increasing funding. If the FCS program proceeds on its current path until problems occur in demonstration, traditional solutions may not be available because of the significant role it must fulfill and its financial magnitude.

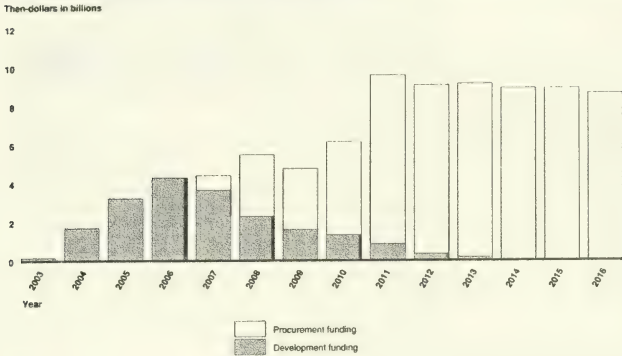
¹⁰ See U.S. General Accounting Office, *Issues Facing the Army's Future Combat Systems Program*, GAO-03-1010R (Washington, D.C.: Aug. 13, 2003).

**Alternatives Featuring
Lowering FCS
Performance or Increasing
Funds May Be Difficult**

While there is a significant amount of potential flexibility among the various FCS systems and technologies, collectively the system of systems has to meet a very high standard. It has to be as lethal and survivable as the current force and its combat vehicles have to be a fraction of the weight of current vehicles to be air transportable on the C-130 aircraft. These "must haves" constrain the flexibility in relaxing requirements for the FCS system of systems.

The opportunity for increasing funds to cover cost increases poses a challenge because FCS already dominates the Army's investment budget. It might be difficult to find enough other programs to cut or defer to offset FCS increases. Assuming the Army's acquisition cost estimates are accurate and the program will succeed according to plan, the FCS investment for even the first increment is huge—\$92 billion (in then-year dollars). These assumptions are optimistic as risks make problems likely, the cost estimate was based on an immature program, and budget forecasts have already forced deferral of four FCS systems. As estimated, FCS will command a significant share of the Army's acquisition budget, particularly that of ground combat vehicles, for the foreseeable future. In fiscal year 2005, the FCS budget request of \$3.2 billion accounts for 52 percent of the Army's proposed research, development, test and evaluation spending on programs in system development and demonstration and 31 percent of that expected for all Army research, development, test, and evaluation activities. See figure 4 for FCS costs through 2016.

Figure 4: FCS Funding Climbs, Then Levels Off at Nearly \$9 Billion Annually



Source: U.S. Army.

The ramp up in FCS research and development funding is very steep, going from \$157 million in fiscal 2003 to \$1.7 billion in fiscal 2004 to a projected \$3.2 billion in fiscal years 2005 and topping out at about \$4.3 billion in fiscal 2006. FCS procurement funding is projected to start in fiscal 2007 at \$750 million and ramp up to an average of about \$3.2 billion in fiscal years 2008 and 2009. In late development (2008-2009) the total FCS costs will run about \$5 billion per year. After 2008, FCS will command nearly 100 percent of the funding for procurement of Army ground combat vehicles. After 2011, FCS costs will run nearly \$9 billion annually to procure enough FCS equipment for two Units of Action per year. According to Army officials, it is not yet clear that the Army can afford this level of annual procurement funding for FCS. The consequences of even modest cost increases and schedule delays for FCS would be dramatic. For example, we believe that a 1-year delay late in FCS development, not an uncommon occurrence for other DOD programs, could cost \$4 billion to \$5 billion. A modest 10 percent increase in production cost would amount to over \$7 billion.

In a broader context, any discussion of DOD's sizeable investment that remains in the FCS program must also be viewed within the context of the fiscal imbalance facing the nation within the next 10 years. There are important competing priorities, both within and external to DOD's budget, that require a sound and sustainable business case for DOD's acquisition programs based on clear priorities, comprehensive needs assessments, and a thorough analysis of available resources. Funding specific program or activities will undoubtedly create shortfalls in others.

Alternatives for Proceeding

Alternatives to developing FCS capabilities that do not follow a concurrent strategy are feasible, if acted upon early enough. Alternatives should have the common elements of building more knowledge before making program commitments; preserving the advantages of the FCS concept, such as defining an architecture before individual systems are developed; and spinning off mature technologies to systems already fielded. Alternatives that would allow for building such knowledge include:

- Adding more time to the FCS program with its scope intact to reduce concurrency would lower risk. However, until technologies are mature and more is known about whether the FCS concept will work, there still would not be a sound basis for estimating how much time will be needed to build the knowledge needed to complete system development and demonstration.
- Focus on the development and demonstration of its most critical capabilities first, such as the network. This could be done by conducting one or more advanced technology demonstrations¹¹ to reduce technical and integration risks in critical areas, then proceed with an acquisition program. This would take more time than if the current FCS schedule were successfully carried out.
- Focus on maturing the most critical technologies first, then bundle them in demonstrations of capabilities, such as Advanced Concept Technology Demonstrations,¹² then proceed with an acquisition program that would attain sufficient knowledge at the right acquisition junctures. This would

¹¹ Advanced technology demonstrations are used to demonstrate the maturity and potential of advanced technologies for enhanced military operational capability or cost-effectiveness and reduce technical risks and uncertainties at the relatively low costs of informal processes.

¹² An Advanced Concept Technology Demonstration is a demonstration of the military utility of a significant new capability and an assessment to clearly establish operational utility and system integrity.

also take more time than if the current FCS schedule were successfully carried out.

Objectives, Scope, and Methodology

To develop the information on whether the FCS program was following a knowledge-based acquisition strategy and the current status of that strategy, we contacted, interviewed, and obtained documents from officials of the Offices of the Under Secretary of Defense (Acquisition, Technology, and Logistics); the Secretary of Defense Cost Analysis Improvement Group; the Assistant Secretary of the Army (Acquisition, Logistics, and Technology); the Program Executive Officer for Ground Combat Systems; the Program Manager for Future Combat Systems; and the Future Combat Systems Lead Systems Integrator. We reviewed, among other documents, the Objective Force Operational and Organizational Plan for Maneuver Unit of Action and the Future Combat Systems' Operational Requirements Document; the Acquisition Strategy Report, the Baseline Cost Report, the Critical Technology Assessment and Technology Risk Mitigation Plans, and the Integrated Master Schedule. We attended the FCS Business Management Quarterly Meetings, Management Quarterly Review Meetings, and Directors Quarterly Review Meetings.

In our assessment of the FCS, we used the knowledge-based acquisition practices drawn from our large body of past work, as well as DOD's acquisition policy and the experiences of other programs. We discussed the issues presented in this statement with officials from the Army and the Secretary of Defense, and made several changes as a result. We performed our review from July 2003 to March 2004 in accordance with generally accepted auditing standards.

Mr. Chairman, this concludes my prepared statement. I would be happy to answer any questions that you or members of the subcommittee may have.

Contacts and Staff Acknowledgments

For future questions about this statement, please contact me at (202) 512-4841. Individuals making key contributions to this statement include Lily J. Chin, Marcus C. Ferguson, Lawrence Gaston, Jr., William R. Graveline, W. Stan Lipscomb, John P. Swain, and Carrie R. Wilson.

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STATEMENT BY
LIEUTENANT GENERAL JOSEPH L. YAKOVAC, JR.
MILITARY DEPUTY TO THE
ASSISTANT SECRETARY OF THE ARMY
(ACQUISITION, LOGISTICS AND TECHNOLOGY)

BEFORE THE

TACTICAL AIR AND LAND FORCES SUBCOMMITTEE
COMMITTEE ON ARMED SERVICES
UNITED STATES HOUSE OF REPRESENTATIVES

SECOND SESSION, 108TH CONGRESS

ON THE FUTURE COMBAT SYSTEMS

APRIL 1, 2004

NOT FOR PUBLICATION
UNTIL RELEASED
BY THE COMMITTEE
ON ARMED SERVICES

**STATEMENT BY
LIEUTENANT GENERAL JOSEPH L. YAKOVAC, JR.
MILITARY DEPUTY TO THE
ASSISTANT SECRETARY OF THE ARMY
(ACQUISITION, LOGISTICS AND TECHNOLOGY)

ON THE FUTURE COMBAT SYSTEMS**

Introduction

Mr. Chairman and distinguished members of the Subcommittee, thank you for this opportunity to report to you on the Future Combat Systems (FCS). It is my privilege to represent the Army leadership, the military and civilian members of the Army acquisition workforce, and the Soldiers who rely on us to provide them with world-class weapon systems and equipment so they can successfully accomplish any mission at anytime, anywhere in the world.

This is a time of tremendous change, and we are most grateful for your wisdom, guidance, and strong support. Over the last year, our Army has met the demands of the Global War on Terrorism, with more than 330,000 troops deployed around the world in more than 120 countries. Our Army was instrumental in the defeat of Saddam Hussein and the subsequent liberation of more than 46 million people from oppression and despair. Our Army remains a central and critical participant in Operation Iraqi Freedom and Operation Enduring Freedom in Afghanistan. Although these and other operations have stressed the force, our Soldiers have responded magnificently.

We are most grateful, too, for your continued support of our Army's transformation. The goals of Army transformation are to provide relevant and ready forces that are organized, trained, and equipped for full spectrum joint, interagency, and multi-national operations and to support Future Force development. Our Future Force is the operational force the Army continuously seeks to become – a strategically responsive, networked, precision, capabilities-based, maneuver force that is dominant across the range of military operations envisioned for the future global security environment.

Both current experiences and emerging operational imperatives confirm the Army's judgment that the FCS-equipped Unit of Action (UA) is the organizational template capable of meeting the regional combatant commander's requirements of the future. By accelerating the transformation of the Current Force toward a modular force with many of the characteristics of the FCS-equipped Future Force, we will accelerate our transformation in areas such as doctrine, training, and leader development. Such a force will be agile, lethal, networked, precise, rapidly deployable, modular and born Joint. The modular Army we are building today is the bridge to the FCS-equipped Unit of Action.

Comment: ??

The FCS-equipped Maneuver Unit of Action is not just a unique Brigade Combat Team, built around a family of systems, but a new concept for fighting those systems. This formation will be part of a Joint

team that is decisive across the spectrum of conflict, in all types of operations, against the complexity of threat capabilities, in a variety of terrain and weather environments. The UA balances the capabilities for strategic responsiveness and battlespace dominance, resulting in an expeditionary force with campaign qualities. It can perform tactical and operational maneuver by land, air, and sea. The UA can be tailored with additional capabilities for specific missions during a campaign. It employs its revolutionary C4ISR architecture to expand or contract its span of control and integrate Unit of Employment (the next higher Army echelon) or Joint Task Force supporting capabilities to accomplish missions. Its significantly improved ability to collect and process information using organic and external Joint and Army supporting sensors and sources ensure that commanders will possess the timely, accurate intelligence necessary to achieve decision superiority. The UA improves the ability of Soldiers and leaders to achieve lethality and survivability overmatch. Like our Current Forces, the foundational centerpiece of the formation remains Soldiers and leaders, enabled by technology, within mounted and dismounted small unit fighting teams.

Program Description

The objective of the FCS program is to field an integrated combat capability at the unit level as opposed to developing individual systems. Central to this approach is the integrated development and acquisition of

sensors, unmanned air and ground systems, and manned combat systems working together and connected by a network that provides increased combat effectiveness.

The most important effort for the development of the UA is the application of sound System of Systems engineering beginning first with good analysis and functional allocation of requirements. We are committed to this systems engineering process and to the generation of program management metrics, which will ensure an FCS program that is in control, within reasonable risk and on schedule for a 2010 fielding of the UA. We believe the FCS program is progressing in conjunction with these accepted engineering processes.

To separate individual entities from the overall FCS development, at this time, would be detrimental to the complex integration effort so critical to the success of the FCS program. The design would not be compatible with the integrated architectures, to include sustainment, developed specifically for the Unit of Action.

The Army and the entire FCS development team are engaged in executing the integrated schedule and work plan that will achieve the objective of fielding transformational integrated capabilities in the shortest possible time. This plan includes completing requirements and functional

reviews in 2004, completing preliminary design in 2005 and pre-production design in 2006, leading to assembly and delivery of the initial pre-production (Lead Manned Ground Vehicle System) NLOS-C, in fiscal year 2007.

To ensure effective cost and schedule control the Army and the LSI have implemented an Earned Value Management System (EVMS). We are now in the process of providing Congress access to this EVMS data. EVMS provides a powerful analytical capability to support integrated performance decisions based on detailed knowledge of cost, schedule, and technical performance. The committee will have unprecedented access and insight into program performance by virtue of its access to the program's EVM data.

Complementary Program Definitions and Systems

Complementary systems to the FCS-equipped Unit of Action (UA) are those systems or technologies resident within the UA but not one of the 19 FCS core systems making up the FCS Family of Systems (FoS). These systems will function separately or be integrated into one or more of the 19 FCS Core systems. These are systems essential to get the FCS Family of Systems (FoS) to work together and/or to support system-of-systems (SoS). These systems facilitate UA operations. UA Associate

Programs (AP) are those programs that FCS must interoperate with as detailed in the FCS ORD and in the Command, Control, Communications, Computers and Intelligence Support (C4ISR) Plan.

The FCS-equipped UA is networked via a C4ISR architecture, including networked communications, network operations, sensors, battle command system, training, and both manned unmanned reconnaissance and surveillance capabilities, that will enable levels of situational understanding and synchronized operations heretofore unachievable. Some of the complementary programs that are key to the successful development and employment of FCS as enablers to the FCS-UA Network include: Joint Tactical Radio System (JTRS), Warfighter Information Network-Tactical (WIN-T), and Distributed Common Ground System-Army (DCGS-A).

FCS Complementary Program (CP) Management

As part of the joint Army-OSD review and analysis process leading to a successful FCS Milestone B decision in May 2003, it became clear that, for the FCS Program to succeed, other existing programs with systems essential to the system-of-systems employment concept for the FCS-equipped Unit of Action (UA) needed to be synchronized with FCS

Program development and fielding timelines. Accordingly, synchronization of FCS and complementary system timelines was identified as a top priority and occurs on many levels.

Within the FCS Program, the Project Manager, Unit of Action (PM-UA) – formerly PM-FCS – has partnered with the Lead Systems Integrator (LSI), the Boeing Company with its partner Science Applications International Corporation (SAIC), to integrate Complementary and Associate programs into the overall FCS Program. As such, the LSI has responsibility for ensuring integration required to meet system-of-systems (SoS) specification functionality and performance. In conjunction with the LSI, the FCS Complementary Programs (CP) IPT has responsibility for developing the overarching integration and management approach for CPs and develops and implements plans with Army and other service counterparts for identification and management of CPs. The CP IPT provides the communications path to define the SoS-level interface and interoperability requirements for each FCS complementary and associate system.

In those cases where an existing or developmental program has applicability to FCS, Associate Contractor Agreements (ACAs), as required, are executed, between the LSI and the prime contractor for the identified program – or a directed subcontract arrangement is invoked

under the LSI agreement. The ACAs are needed because the LSI is a contractor and not a government agency. An ACA will not always be required and the need may be filled with only a government-to-government Memorandum of Agreement (MOA). The purpose of these MOAs (and Subordinate MOAs) is to establish the responsibilities and management processes between PEO, Ground Combat Systems (PEO-GCS), PM-UA, and the other PEOs/PMs in order to procure, develop, test and field an FCS-equipped UA. The MOAs/SMOAs also provide a basis for cooperative, technical and, acquisition efforts between PEO-GCS, PM-UA, and the other PEOs/PMs. The MOAs/SMOAs are what we are using now to facilitate this significant coordination effort. Current count within the Army is 19 PEO-to-PEO MOAs and 44 PM-to-PM SMOAs. The Army recognized that if FCS were to be successful, a permanent process in addition to the MOAs, SMOAs and ACAs would be required.

Within the Army, in recognition of FCS Program complexity and interdependence on other standalone complementary programs in order to meet UA and Unit of Employment (UE) required capabilities, the Army G8 and the Military Deputy to the ASA(ALT) established a complementary systems management and oversight process documented in a Memorandum Of Agreement (MOA) signed in August 2003. This MOA established an Army Complementary Systems Synchronization Integrated Process Team (IPT) at the O-6 level to synchronize the network,

survivability, lethality, sustainability and training aspects of FCS with 1-, 2-, and 3-Star GOSCs for review and approval of synchronization recommendations. Additionally, functional Complementary Systems Working Groups (CSWG), co-led by G8 and ASAALT, provide action-level support for identification and synchronization of complementary programs. Key tenets/functions of the complementary systems management process:

- Identify programmatic disconnects and funding shortfalls with complementary systems.
- Develop work-arounds to rectify disconnects and for resources and adjustments to the FCS/UA/UE Complementary Systems list.
- Ensure program baselines for the UA and candidate UE Complementary System include FCS key programmatic events as part of their program oversight.
- Manage and track cost, schedule and performance identified in the program baselines for the UA Complementary Systems and candidate UE Complementary Systems.

The Synchronization IPT Council of Colonels is co-chaired by Deputy Chief of Staff, G8 and ASA(ALT) representatives and has membership from all parts of the Army. The Synchronization IPT exists to resolve issues. If the issue is within the Army's purview, the IPT will map out

appropriate resolution to include adjustment of other program funding, scheduling or performance requirements. The IPT then weighs the impacts of proposed alternatives and decides on a Course Of Action (COA) — based on impacts across the Army — and informs the Army Acquisition Executive (AAE) of the preferred COA prior to implementation. If consensus cannot be reached, the issue and alternatives are taken to the AAE for disposition and resolution. One final note – the complementary systems synchronization process within the Army, as documented, is as described, but the MOA governing the process is currently under revision to include the TRADOC Futures Center with its establishment on November 4, 2003. In the revision, the TRADOC Futures Center would serve as “tri-chair” at every level of the synchronization effort – from CSWG through 3-Star GOSC.

Within OSD, the Defense Acquisition Executive (DAE) has directed grouping FCS Defense Acquisition Executive Summary (DAES) reporting together with key complementary system programs. So, FCS is now grouped together with Joint Tactical Radio Systems (JTRS), Warfighter Information Network – Tactical (WIN-T), Distributed Common Ground System – Army (DCGS-A) DAES reporting to the DAE. In terms of FCS-UA Complementary System synchronization and issue resolution, if an issue resides external to the Army and cannot be solved at the PEO level, the Army’s Complementary Systems Synchronization IPT will meet with

additional members included to represent their respective services/organizations as required. Once alternatives are assessed, the Synchronization IPT will present its recommendation to the AAE in preparation for convening an Overarching IPT (OIPT) or joint OIPT, depending on the issue, to assess and present a recommended COA. If the COA can be effectively instituted at the OIPT level, the DAE will be notified of the decision. If consensus cannot be reached, the OIPT will recommend convening a special Defense Acquisition Board (DAB) to bring the issue to closure.

FCS Technology and Complementary Program Risk Management

Recognizing the importance of critical technologies and complementary programs to the development and fielding of FCS, the FCS Program has established a robust risk mitigation strategy for those systems that are on the FCS critical development path. The FCS Program is mitigating these technical risks through employment of a formal Risk Management process with OSD/DA oversight and through documentation of customer-supplier relationships with FCS technology suppliers through written Technology Transition Agreements (TTAs).

Increment 1 Critical Technologies

The FCS Acquisition Strategy Report (ASR) documented the conscious recognition that some FCS critical technologies were not sufficiently mature at Milestone B per General Accounting Office (GAO) and Department of Defense (DoD) 5000-series guidelines. The ASR specifies that continued technology maturation will continue in SDD, provided that:

- Technologies can be matured to appropriate Technology Readiness Levels (TRL) by the Preliminary Design Review (PDR/April 05), and/or
- Full integration can be demonstrated at the time of operational testing.

Recognizing that this approach does introduce additional cost and schedule risk into the program, DoD specified in the Milestone B Acquisition Decision Memorandum (ADM) that the FCS will mitigate this risk by:

- Executing formal Risk Mitigation Plans (RMP) with OSD/DA oversight, and
- Documenting customer-supplier relationships with our technology suppliers through written Technology Transition Agreements (TTAs).

PM, Unit of Action (PM-UA) and the Lead Systems Integrator (LSI) have identified 31 critical technologies, developed risk mitigation plans for them, and are actively developing TTAs to document technology deliverables with our technology suppliers.

The Risk Mitigation Plans contain, where applicable, technology "off ramps" or "tollgates" - specific decision points and criteria where decisions would potentially be made to use alternate, less risky (and less capable) technologies and technology development/integration strategies.

Risk Management Program

The FCS Risk Management Program Plan lays out the methodology and processes used to manage programs for both FCS core Critical Technologies (CT) and FCS Complementary Programs (CP). Risk Mitigation Plans (RMP) have been developed, or are in the process of being developed, that address both technology maturation risk and system/system-of-systems integration risks into the FCS Family of Systems (FoS) and the greater Unit of Action (UA) at the system-of-systems level. Where applicable, these RMPs contain technology "off ramps" or "tollgates" – specific decision points and criteria where decisions would potentially be made to use alternate, less risky (and potentially less

capable) technologies and technology development and integration strategies – or, in the case of complementary programs, alternative complementary programs. Decisions to use these “off ramps” or “tollgates” will be made based upon cost, schedule, performance, and/or technology maturity criteria, and are included in many of the on-going trade studies. The FCS program will execute the off ramps, as needed, when building the program technical baseline. However, the overriding consideration to any decision to execute an “off ramp” is to understand that the focus ultimately is not on these technologies, CPs, or their respective alternatives (taken individually) – but in how each impacts the overall performance of the FCS system-of-systems construct.

Key Program Tenets

To obtain the best value for, and in recognition of program complexity, the Army is using the LSI as the single accountable, responsible contractor to integrate the FCS on time and within budget, while reducing the logistics footprint. The LSI will act on behalf of the Army to optimize the FCS capability, maximize competition, ensure interoperability and maintain commonality in order to reduce life cycle cost. The Army will maintain oversight and final approval of the LSI's subcontracting and competition plans. The key tenets of the program and the principles by which this acquisition strategy was developed are:

- Create Opportunity for Best of Industry to Participate.
- Leverage Government Technology Base to Maximum Extent.
- Associate On-Going Enabling Efforts with LSI-Led Activity.
- Collaborative Environment from Design through Life Cycle.
- As a Minimum, Commonality at Subsystem/Component Level.
- Design/Plan for Technology Integration and insertion.
- Maintain and Shape the Industrial Base for the Future
- Retain Competition throughout Objective Force Acquisition.
- Appropriate Government Involvement in Procurement Processes.
- Consistent and Continuous Definition of Requirements
- Maintain and Shape Government Acquisition Community.
- Program Affordability--*Balance* Performance and Sustainment.

Competition

A key FCS program tenet is to maintain competition and create opportunities for the "best of industry" to participate. The LSI implemented these tenets by issuing 23 competitive solicitations involving multiple

contract years and millions of dollars in actual work content that would shape the FCS team. These solicitations were issued on a "best value" basis with the intent to attract the best technological approaches and the most reliable partners industry could offer. It was a remarkable feat that all solicitations were conducted simultaneously in approximately the same time it would take to conduct one source selection of this magnitude. Approximately 600 government and LSI subject matter experts were assembled to tackle this endeavor. The winning 21 industry partners have joined forces with the LSI to form a "One-Team" approach to FCS program challenges.

Industrial Base

Another key tenet mentioned is to maintain and shape the Industrial Base for the Future. We are experiencing a changing environment in our country's defense industrial base. We are charged with balancing the pace at which we move into the future while maintaining the capability to support the current force requirements. We must strike a balance on the correct mix of depot, arsenal and industry capabilities in order to be able to afford to field future requirements.

To ensure on-time delivery of cost-effective and reliable equipment, the LSI/government team will perform a series of Industrial Capability Assessments (ICA) as required by the Department of Defense (DoD) (Title 10, United States Code 2440). The resulting document assesses industry capability and identifies risks associated with manufacturing products that meet FCS requirements over the life of the program merge. Once identified, the supply base will develop and implement plans to mitigate the risk subject to approval of the Army.

The ICA process will identify and mitigate risk in supplier manufacturing processes. The deliverable is a periodic report to the Army Tank and Automotive Command (TACOM) that assesses industry capability to produce FCS products and services. The near term focus is on understanding the FCS product design that will be developed and integrated through the supply base via the IPT process. The Army Materiel Systems Analysis Activity (AMSAA) will assist with determining whether technologies are ready for incorporation into the design. The resultant product design defines what the suppliers will produce and what is to be assessed.

A parallel near term effort is the selection of suppliers and information gathering regarding their capabilities. The LSI utilizes this information to identify risks to the supplier's ability to design, prototype, produce and

support FCS products and services. Identified risks will be coordinated with the suppliers through the IPTs using the LSI Risk Management Plan. The end result of the assessment of industry capabilities to support the FCS development and fielding effort will inform both existing and future industrial base support requirements. Ultimately, the development and fielding of the FCS equipped UA, will shape the industrial base for decades to come, due to the sheer size and complexity of the systems and technologies encompassed in this system of systems development,

As the technology progresses and requirements change there will continue to be a requirement to bend metal and manufacture platforms and structures. Our charge is to maintain and shape that industrial base to maintain the capabilities required for both the current and future requirements.

One-Team

The LSI, its partners and the government have embraced the One-Team concept. This is accomplished through IPTs: co-locations at government and contractor facilities; use of an advanced collaborative environment as the single authoritative source of management, product and technology information; and program management plans that establish joint management procedures and processes. The One-Team concept

incentivizes the LSI, customer and industrial partners to share the same destiny.

CONCLUSION

The FCS program is vital to UA development and fielding and is the Army's top materiel development program that will provide unprecedented military capability for the Future Force. The real winner in our success is the Soldier. We serve the Soldier. The most technologically advanced platforms are useless without the intellect, dedication, and remarkable sense of duty of the American Soldier. The Soldier remains the centerpiece of our combat systems and formations and is indispensable to the Joint Team. Adaptive, confident, and competent Soldiers, infused with the Army's values and warrior culture, fight wars and win the peace. Working with Congress, we will keep the Army ready to meet today's challenges and continue to make significant strides toward the fielding of our Future Force.

STATEMENT BY

LIEUTENANT GENERAL BENJAMIN GRIFFIN

DEPUTY CHIEF FOR PLANS AND PROGRAMS (G8), UNITED STATES ARMY

BEFORE THE

TACTICAL AIR AND LAND FORCES SUBCOMMITTEE

ARMED SERVICES COMMITTEE

UNITED STATES HOUSE OF REPRESENTATIVES

ON THE ARMY'S CURRENT FORCE PROTECTION PROGRAM INITIATIVES AND
OTHER MAJOR GROUND COMPONENT ACQUISITION PROGRAMS

FIRST SESSION, 108TH CONGRESS

APRIL 1ST, 2004

Mr. Chairman and distinguished members of the Committee, thank you for the opportunity to appear before you today along with my friend, Lieutenant General Ed Hanlon, the Commanding General, Marine Corps Combat Development Command. As you are aware, Soldiers and Marines are operating "shoulder-to-shoulder" in the streets of Iraq and other dangerous places worldwide and performing magnificently. We take pride in our close relationship with the Marine Corps, and it's appropriate that we appear together to address your concerns and share with you what we've accomplished and where we're going.

Let me begin by expressing the Army's appreciation for the Committee Members and Staff's outstanding support to our Soldiers who are serving our country around the world, as well as to their families at home. Because we are here in part to answer your concerns regarding force protection, I would like to make a special point of expressing the Department's appreciation of the tremendous support this committee has provided for Army force protection measures and equipment.

I know that you are very much interested in ensuring that our servicemembers have available the best protective equipment in the required quantities. We obviously share that concern. In the last six months, I have visited Army units in both Iraq and Afghanistan, most recently in February, to specifically look at how well our programs are being executed to equip our Soldiers and units with force protection equipment. In addition to these periodic visits by senior Army leadership, the Department of the Army has established a number of forward liaison elements in theater to facilitate information

exchange and to solve problems. I have a dedicated liaison officer stationed in theater at the Combined Forces Land Component Command headquarters and Combined Joint Task Force-7. This officer reports to the Army Staff and theater commanders' staff, addressing force protection and other Reset issues. We also have liaisons in two of the Divisions that are in theater.

I am grateful to have the opportunity to share what I have learned with you. What the Army, with the essential support of the Department of Defense and Congress, has been able to accomplish in a relatively short period of time is truly remarkable, however we will not rest---nor be satisfied---until every requirement has been fully met.

I know you have heard from the Acting Secretary of the Army, Mr. Les Brownlee, that we are "an Army at war, serving a Nation at war." For the Army, that means nothing is "business as usual." Every aspect of equipping Soldiers for the challenges of operations in Operation Iraqi Freedom, Enduring Freedom or the Global War on Terrorism is being intensively managed to ensure that equipment is tested, acquired, distributed and issued as quickly as humanly possible. During my visits to the Area of Operations, every Soldier, from Private to Lieutenant General, has expressed appreciation for the efforts being made on their behalf to get them the latest force protection equipment. Their thanks were nice, but I am fully cognizant that we still have work to do in this area.

The resources that have been applied to this challenge are considerable. The funding provided in the FY04 Supplemental enabled us to accelerate production of a

number of key pieces of force protection equipment, and we greatly appreciate this Committee's support in providing us the needed resources. Additionally, the timely support this committee has provided in approving reprogramming actions to resource force protection equipment has been crucial and is appreciated.

I would like to take this opportunity to address some of the most important force protection equipping items in more detail. First, Up-Armored HMMWVs. As you are probably aware, theater commanders submitted their first request for additional Up-Armored HMMWVs in May 2003. Since then, the requirement has steadily increased and stands today at 4,388. Army leadership has worked closely with the commercial sector to meet this requirement, and as a result, by May, production will climb to 220 vehicles per month. With the receipt of \$331 million in reprogramming, we will be able to move 300 vehicles per month by July 2004. As of today, there are over 2,349 Up-Armored HMMWVs in theater to meet Soldier needs. This has been made possible by means of production acceleration, worldwide redistribution, and with the great support of Congress and Industry. We are on track to meet the current requirement by October 2004. With your consistent support, the Up-Armored HMMWV program has received over \$400 Million dollars of additional funding to date.

Complementing this effort is the Army's program to add ballistic protection to light vehicles and selected aviation platforms. At the request of the theater commander, and again, with the support of Congress and Industry, the Army is well underway with a program to add ballistic protection to over 11,000 vehicles and aircraft. To ensure that

these kits deliver the expected amounts of protection and do not create a separate danger to Soldiers by overloading vehicles or creating shrapnel, the Army has extensively tested these kits against a variety of expected threats. Over 2,000 armor kits have already been installed, mostly on HMMWVs, and we will take delivery of a total of 6,900 HMMWV armor kits by May 2004. We plan to take delivery of all kits to meet the current requirement by October 2004. We are establishing multiple installation sites to install the armor and looking at innovative ways to accelerate this process. This is complex work, because the commanders in theater need the vehicles to do their daily missions, so the installation must be carefully coordinated to avoid interference. The vehicle armoring program to date has been funded at \$650M when recent reprogrammings are included, again with the support of Congress.

The foundation and focal point of our Army is the Soldier. Needless to say, protection of the Soldier is paramount. Interceptor Body Armor provides the best individual ballistic protection available in the world. Production of Interceptor Body Armor is operating at the maximum level that industry can support and is delivering 25,000 sets per month. There is now enough Interceptor Body Army in theater to equip every Soldier in Iraq, Afghanistan and Kuwait. Because of that, the Army will soon stop sending Interceptor Body Armor to the theater, and will instead equip Soldiers at their home stations before they deploy. The Chief of Staff of the Army has decided to acquire sufficient amounts of Interceptor Body Armor to equip every Soldier in the Army in deployable units and to provide at US Army training installations. We look forward to working with this committee and Congress to accomplish that plan.

The Rapid Fielding Initiative or RFI, as it is known, has been a huge success for the Army. This program provides Soldiers with state-of-the-art enhancements to their lethality, their protection, and their ability to operate. Specific items include weapons optics, clothing, boots, kneepads and other items. RFI is being issued to all deploying Soldiers, with tailoring of the "kit" based on the mission requirements. Fielding for units on the second rotation of Operation Iraqi Freedom and the fifth rotation of Operation Enduring Freedom will be complete by August. The Army has chosen to equip all Soldiers in deployable units with RFI by the year 2007 and again, we look forward to addressing that need with this Committee and others.

Other key force protection efforts have included the accelerated fielding of unmanned aerial vehicles to identify enemy forces emplacing ambushes, fielding of a lightweight counter mortar radar to pin-point enemy mortar sites, distribution of elevated sensors for fixed sites to give commanders an additional means of monitoring the key areas around their installations, and procurement of robots to help explosive ordnance disposal teams more safely disarm explosive devices. The Army has also accelerated the fielding of countermeasures for improvised explosive devices. The Acting Secretary of the Army and Chief of Staff have established Aviation Survivability Equipment as one of the highest priority force protection programs in the Army. In November 2003, the Acting Secretary of the Army Mr. Brownlee directed the acceleration of aircraft survivability equipment to deployed forces. All aircraft have ASE.

We are upgrading our capability to enhance protection of deployed aircraft. Each of the above items represents a success story in its own right, and I look forward to your questions on those topics. Because information on some of these capabilities may have potential benefit to our adversaries, some of these areas may have to be addressed in a closed session.

Perhaps even more important than fielding equipment is the dissemination of new tactics, techniques and procedures for dealing with an enemy that is adaptive and learning. For that reason, in October 2003, the Army activated an organization known as the Improvised Explosive Device, or IED, Task Force. The IED Task Force has played a crucial role in assisting commanders in the training of their Soldiers, in the development of new doctrine, the dissemination of lessons learned, and the identification of new equipment needs. The Task Force maintains teams in Iraq and Afghanistan to directly support the theater commanders and has played a major role in protecting our Soldiers.

As well as fielding the best equipment to our Soldiers involved in the Global War on Terrorism, the Army continues to improve Soldier equipment based on lessons learned. A good example of this is the Army's testing of a new modular weapon system that allows the weapon to be modified to meet specific mission requirements. A candidate being tested is the XM8, which provides multiple variants (compact, carbine, sharp shooter and automatic rifle), based on a core weapon system. Initial feedback from Soldiers has been very positive.

In your invitation memorandum you indicated you were interested in our programs to sustain our armored combat and tactical vehicles; while that is an area not under my direct management, I want to provide you with some information on what is taking place in this area. The pace of operations and the environment of Iraq, Afghanistan, and Kuwait present clear challenges in maintaining equipment. To meet these needs, the Army has established numerous current ground force sustainment programs in the Area of Operations. We have established a Forward Repair Activity composed of select capabilities from both Anniston and Red River Army Depots. This activity provides support to both combat and tactical equipment. There has been a HMMWV Support Center in Iraq since October 2003 and it has serviced more than 2100 vehicles and applied 356 sets of Add-on Armor. To date, these field repair activities have completed more than 12,572 work orders and validated the estimated cost of battlefield damage for more than 4,100 items. The Rapid Manufacturing System has produced 972 piece parts. The Field Repair Activity at Camp Arifjan has installed 355 sets of Add-on Armor. Camp Udari and Jahra sites have installed 590 armor kits and 65 HEMTT wheel retrofit kits. Similar activities are taking place for the commodities of electronic equipment, aviation, and other key items. The Army has an activity in-theater, which provides theater level intermediate and selected depot support for all Army aviation systems. In addition to the in-theater sustainment programs, the Army received \$1.2 billion dollars for depot level maintenance to set the force for future contingencies and missions.

As I said earlier, this is not "business as usual," we are an Army at War, and we know our Soldiers are relying on us to provide them the equipment, the training, and the sustainment to succeed--- we will not let them down.

You requested information on unfunded requirements and shortfalls in the Army's fiscal year 2005 budget. On 19 March, the Army provided its prioritized shortfall list to Congress, in response to the request of the Honorable Ike Skelton. Force Protection Items are the highest priority, and we continue to reprogram funds to the fullest extent possible, supporting procurement of Interceptor Body Armor, RFI items, vehicle ballistic armor kits, and up-armored HMMWVs.

I cannot stress enough the importance of the Army's Modularity initiative. If we are to remain a relevant and ready force, the Army must modularize. We are making great strides to meet this crucial requirement through shifting existing equipment assets to the fullest extent possible, but we anticipate that the procurement of equipment and vehicles will be critical to meet our desired end state.

The Global War on Terror is taking a heavy toll on existing equipment and vehicles currently supporting the War effort, and we are taxing our Army Prepositioned Stocks, or APS assets heavily. Setting the Force, as we call this mission, will require new procurement to replenish APS, combat losses, and equipment that is worn out by excessive operational tempo. Setting the Force requirements, resourcing and execution are reviewed by a 3-Star Army Staff General Officer Steering Committee every week. As the theater commanders identify force protection or sustainment needs, the Army prioritizes these needs and applies resources, engaging both Congress and OSD as

appropriate. The execution of tasks like the shipping of Up-Armored HMMWVs, Add-on-Armor emplacement, IBA fielding, depot maintenance and pre-deployment equipping all receive weekly oversight from this group to ensure Army units are ready for the fight and our efforts are synchronized.

We appreciate the assistance of the Congress, and especially this Committee, in addressing these needs, and look forward to your continued assistance.

I mentioned earlier that I visited our Soldiers in Iraq and Afghanistan in February. And I know many of the Members and staff from this committee have also taken the time, and endured the risks to do the same. If you are like me, you simply cannot visit such magnificent Servicemembers and not come away in awe at their enthusiasm, their dedication, and their pride in serving this great country.

Mr. Chairman, in closing I would like again to thank you and the members of this distinguished committee for your continuing support of the men and women in our Army, an Army at war and a full member of the Joint Team deployed and fighting terror around the world. I appreciate this opportunity to appear before you today, and I look forward to answering your questions.

Rapid Fielding Initiative (RFI)

RFI leverages commercial off the shelf technology and current programs providing the dismounted Soldier with critical capabilities overmatch over enemy forces

Mobility and Lethality Kit

(Issued to Brigade Combat Teams Only)

Knee and Elbow Pads (1/Soldier)
 Modular Light Weight Load Carrying Equipment (MOLLE) Accessories
 (1/Soldier & Special by Egt. Type)
 Individual Combat Shelter (1/Soldier)
 Multipurpose Tool (1/Soldier)
 Double Key - Cuff (8500/BCT)
 Multi Band Inter/Intra Team Radio (MBITR) (149/BCT)
 Modular Integrated Communications Helmet (MICH) Comms Systems &
 Access. (75 (Single Config) & 150 (Dual Config)/BCT)
 Weapon Light (768/BCT)
 M249 Rail (369/BCT)
 M240B Rail (83/BCT)
 M122/A1 Tripods (87/BCT)
 M24 Small Binoculars (882/BCT)
 VIPER (VECTOR 21)/Mark VII Target Locator (58/BCT)
 Lightweight Shotgun System (162/BCT)
 M249 Ammo Soft Pack (369/BCT)
 M240B Combat Ammo Pack (83/BCT)
 M145 Machinegun Optic (342/BCT)
 TA31F - 4 X Advanced Combat Optic Gunsight (ACOG) (170/BCT)

Soldier Kit—All Soldiers Receive

Advanced Combat Helmet (ACH) and Accessories (1/Soldier)
 Black Fleece Bibs (1/Soldier)
 USSOCOM Silk Weight Underwear (2 SET/Soldier)
 Hydration System (1/Soldier)
 Goggles (1/Soldier)
 Glove System (1 SE/Soldier)
 Cold Weather Cap (1/Soldier)
 Infantry Combat Boot Type II (AF Desert) (1 PAIR/Soldier)
 Improved Hot Weather Desert Boot (1 PAIR/Soldier)
 Socks (4 PR/Soldier)
 Moisture Wicking T-Shirts (4/Soldier)
 Combat Belt (1/Soldier)
 M4/M16 Magazines (14,700/BCT-eSB-Support Soldier Set)

Brigade Combat Teams &

Support Soldiers

Lightweight GPS

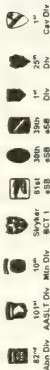
M68 Close Combat Optic 1418 sights for BCTs, eSBs, & Support Soldiers

Brigade Combat Team

Platoon Kit

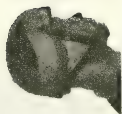
Grappling Hook (27 x BCT)
 Door Ram (27 x BCT)
 Battle Axe (27 x BCT)
 Fiber Optic Viewer (27 x BCT)
 Quickie Saw and Replacement Blades (27 x BCT)
 Modular Entry Tools (27 x BCT)
 Assault Ladder (27 x BCT)

Fielded as of 31 March 04

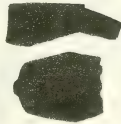


Soldier Kit

All Soldiers Receive



Advanced Combat Helmet (ACH)
and Accessories



USSOCOM
Silk Weight Underwear



Coolmax & Polarmax T-Shirts



Black Fleece Bibs



Wiley-X Goggles



Hydration System



Combat Belt



Standard Army Desert Boot



AF Desert Flyers Boot



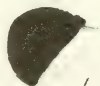
M4/M16
Magazines



COTS Socks (4 Per)



Glove System



Cold Weather Cap



Close Combat Optic
(fielded to Soldiers
with M16 or Carbine)

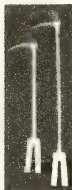
Brigade Combat Team Platoon Kit



Quickie Saw and Replacement Blades



Grappling Hooks



Halogan Tool



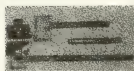
Fiber Optic Viewer



Modular Entry Tools



Door Ram

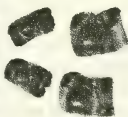


Battle Axe

Mobility / Lethality Kit (Issued to BCTs Only)



Advanced Combat Optical
Gunsight (ACOG)



Knee and Elbow Pads



MICH Comms Systems
and Accessories



M122/A1 Tripods



M249 Rail / M240 Rails



M4/M16
Magazines



(Lightweight Shotgun System)



XM107**



Mark VII



Weapon Light



VIPER (VECTOR 21)



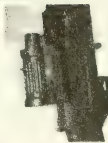
MBITR



Light Weight GPS



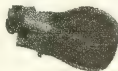
Small Binoculars



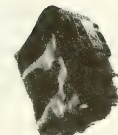
M145 Machine Gun
Optics



MOLLE and Accessories



M249 Ammo Soft pack



M240 Combat Ammo Pack

NOT FOR PUBLICATION
UNTIL RELEASED BY
THE SUBCOMMITTEE OF
THE HOUSE ARMED
SERVICES COMMITTEE

STATEMENT OF
LIEUTENANT GENERAL EDWARD HANLON, JR.
DEPUTY COMMANDANT FOR COMBAT DEVELOPMENT
UNITED STATES MARINE CORPS
BEFORE THE
TACTICAL AIR AND LAND FORCES SUBCOMMITTEE
OF THE
HOUSE ARMED SERVICES COMMITTEE
CONCERNING
CURRENT FORCE PROTECTION PROGRAM INITIATIVES AND
OTHER MAJOR GROUND COMPONENT ACQUISITION PROGRAMS
IN REVIEW OF FY 05 BUDGET REQUEST PROCESS AND FYDP
ON
1 APRIL 2004

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UNTIL RELEASED BY
THE SUBCOMMITTEE OF
THE HOUSE ARMED
SERVICES COMMITTEE

Introduction

Chairman Weldon, Congressman Abercrombie, distinguished Members of the Subcommittee, it is my privilege to report to you on the state of force protection initiatives and other major ground component acquisition programs in review of the fiscal year 2005 budget request process and future years defense program. Let me start by saying that the Marine Corps remains firmly committed to warfighting excellence, and the support of the Congress and the American people has been indispensable to our success in the Global War on Terrorism (GWOT). Your sustained commitment to improving our Nation's armed forces to meet the challenges of today, as well as those of the future, is vital to the security of our Nation. On behalf of all Marines and their families, I thank the Subcommittee for your continued support and commitment to the readiness of your Marine Corps. Throughout this statement, my reference to your Marine Corps includes the outstanding service of our fine Sailors who serve alongside Marines as corpsman, surgeons, chaplains, and other specialists.

Provide a description of major current operational force protection programs and missions with particular emphasis to those programs currently being implemented in Operation Iraqi Freedom.

In terms of Force Protection programs in support of our deployed Marines, let me start by discussing some of the individual protective measures provided. Essentially, when we refer to force protection of individual Marines in regard to the GWOT {Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF)} we are referring to the procurement and issue of Small Arms Protective Insert (SAPI) plates and the Outer Tactical Vests (OTV) in which the SAPI plates are worn. At the outset of OIF, the Marine Corps was already producing SAPI

plates and OTVs to equip our forces. However, the surge demand for combat in OIF I required us to not only adjust our fielding plan to deliver all items coming off the production line to I MEF's active duty and Reserve units but also to direct some redistribution of SAPI plates and OTVs from the other MEFs to support I MEF. To date, the Marine Corps has completed the SAPI plate fielding push required to meet OIF II requirements. All active and Reserve Marines deployed in theater now have 2 SAPI plates and one Outer Tactical Vest. We are now returning to the established fielding rate of 4800 plates per month over the next year. In addition, we are preparing to let a contract, in support of OIF II, for 14K additional plates, with delivery during summer 2004. In the interim, the Marine Corps will redistribute plates as required to both active duty and Reserve units in order to meet any emergent contingencies requiring future combat or peacekeeping deployments.

Finally, as a result of an urgent request from I MEF on 12 March 2004, we are also providing enhanced individual shoulder and side protection that integrates with our SAPI/OTV protection. Initial fielding will begin in early April 2004, with complete fielding to I MEF by mid May 2004. In short, we will ensure our Marines have the best protection available, to include emergent enhancements, whenever and wherever they need it.

To ensure our deployed Marines and Sailors have the equipment needed to support OEF and OIF II, the Marine Corps has implemented the Urgent Universal Need Statement (UNS) process to assist I Marine Expeditionary Force with the rapid fielding of equipment to fill priority capability gaps and shortfalls. Through close coordination between I MEF, the Marine Corps Combat Development Command (MCCDC), Marine Corps Systems Command (MCSC), the Marine Requirements Oversight Council (MROC), HQMC (Programs and Resources), and industry, we have been able to rapidly address the highest priority capability gaps of our

deploying forces. Examples of equipment fielded because of the Urgent UNS process directly related to force protection are:

- Armor and Armor kits for over 3000 I MEF tactical vehicles.

- Auxiliary body armor: supplementary body armor that when fit to the Outer Tactical Vest (OTV) provides additional side and shoulder protection.

- Position Location Information equipment (PLI).

- Counter Improvised Explosive Device (IED) detection equipment.

- Combat Identification (CID) equipment: To prevent/mitigate fratricide.

- Dust Abatement equipment: Assists in allowing aircraft (primarily rotary-wing) to safely land in dusty environments and expeditionary airfields.

- Medium Tactical Vehicle Replacement (MTVR) center seats: Newly designed seats that allow Marines to face outboard vice inboard when transported by truck.

- Vehicle Barrier Nets: New piece of equipment to assist Marine checkpoint facilities.

Provides a non-lethal capability to stop potential vehicle threats.

- Explosive Ordnance Detection Capabilities: Equipment such as explosive protective suits for engineers, mine detection equipment, x-ray machines and robotic capabilities.

The Marine Corps fielded many new items of equipment and weapon systems just prior to or during the deployment of 1st Marine Expeditionary Force for OIF I. Some were in response to requests from the deploying forces, and others were advance-fielded by Marine Corps Systems Command (MCSC). Most new items were positively received, although units did not always have sufficient time to train with these new systems. Thus, some new systems were not used to full advantage. But, in most cases, these new items functioned as intended and were combat multipliers. Of particular significance were: The Dragon Eye unmanned aerial vehicle; the Blue

Force Tracker (BFT) systems; Combat Identification (CID) Panels/ Thermal Identification Panels; and Personal Role Radios (PRR). All of these initiatives provide enhanced unit situational awareness, from squad through division. Commanders noted many instances where SAPI Plates saved Marine lives and reduced the severity of injuries. Night vision devices such as the PAS-13 and PVS-17C/B all enhanced lethality and situational awareness in reduced visibility. The Secure Mobile Anti-jamming Reliable Tactical-Terminal (SMART-T) improved communications, and the Tank/Infantry phone improved infantry/armored coordination in the urban environment.

Another area where the Marine Corps benefits from an improved capability is in tactical ground mobility with the performance of both our Medium Tactical Vehicle Replacement (MTVR) fleet and the High Mobility Multipurpose Wheeled Vehicle (HMMWV) A2 fleet. The increased payload over the predecessor vehicles (i.e., 5 Ton payload replaced by MTVR's 7.5 ton off-road and 15 ton on-road payloads; and HMMWV A1 payload of 2500 lbs replaced by HMMWV A2 payload of 4450 lbs) paid real dividends in the critical lift required to support the drive to Baghdad in OIF I. Similarly, the improved maintenance availability of these newer vehicles will continue to be a key asset to our deployed forces. In our quest for continuous improvement, we are closely scrutinizing Marine Corps, US Army, and coalition emergent lessons learned from OIF II to apply, where applicable, to our continuing series of vehicle upgrades.

Vehicle Hardening

In December 2003, I MEF forwarded an urgent request for vehicle hardening in advance of their deployment to Iraq in support of OIF II. The request was in the form of an Urgent

Universal Need Statement (UNS) and both I MEF and Marine Forces Central Command ranked this request #2 out of a total of 62 requests. The Urgent UNS distinguished between heavy vehicle hardening (provides National Institute of Justice level III protection) and a lesser “baseline” level of protection referred to as medium vehicle hardening. Additionally, the Urgent UNS delineated the number and types of vehicles for which I MEF requested protection. The compressed timeframe and operational urgency accelerated the more deliberate processes that would normally be used to solve a problem of this nature. After a timeline assessment, it was decided that a gap in the coverage of the MEF’s vehicles (between force deployment and delivery of protection) would be filled with a temporary solution. Under the management of Marine Corps Logistics Command (MARCORLOGCOM), the Marine Corps invested \$6M to rapidly provide steel vehicle doors to allow forces to deploy with a modicum of protection until the more permanent solution is delivered. By 19 March 2004, I MEF’s stated requirement of hardening just over 3,000 vehicles was met with a mix of permanent and temporary hardening solutions. The Marine Corps has committed approximately \$9.6M toward heavy hardening of vehicles. For this investment, we will have 110 HMMWVs with the O’Gara Hess Hard Kits and 37 Export Model M1114 HMMWVs. Additionally, we have contract options for an additional 190 of the O’Gara Hess Hard Kits at a cost of \$6.2M. Our investment in medium vehicle hardening covers a broad range of products including Simula Doors, Foster-Miller Appliqué panels, ballistic blankets, and eventually ballistic glass (approximately 25M).

With the current status of vehicle hardening as a basis, the Marine Requirements Oversight Committee (MROC) can now make an informed decision on a course of action for the mid-term regarding additional vehicle hardening for the operating forces. As with the original assessment of the force’s needs, the solution has many variables and is complex. There are

several long-term issues that are under consideration. The Marine Corps is developing a formal vehicle hardening policy. It will address the proportion of the tactical wheeled vehicle fleet that should receive hardening, the optimal mix of medium and heavy hardening, as well as the potential of developing a new vehicle if the threat dictates such an effort.

Fratricide Prevention and Army – Marine Corps Blue Force Tracker (BFT) Convergence

The reduction of friendly-fire incidents continues to be a Marine Corps priority. The Marine Corps, in partnership with the other services and coalition allies, is exploring technologies and procedures to minimize both “blue-on-blue” (friendly fire) and “blue-on-white” (non-combatant) incidents. The Army and Marine Corps employed seven different types of Blue Force Trackers (BFT) during OIF I, with varying degrees of success. While the mix of systems was not ideal, such systems are clearly an important capability and suggest the need for compatible systems across all the services. The Joint Requirements Oversight Council (JROCM 161-03 of Aug 03) directed the Army and Marine Corps to present an integrated briefing to discuss a strategy to converge BFT systems to achieve a single capability. Army and Marine Corps leadership interpret this to mean a single Blue Force Situational Awareness (BFSA) capability (location, identification, status, and intent) rather than just BFT (location and identification). Interoperability and capability gaps exist between the Army’s Command and Control (C2) application – the Maneuver Control System (MCS) - and the Marine Corps’ Command and Control Personal Computer (C2PC) application. Additional shortfalls exist between the Marine Corps BFT program, Data Automated Communications Terminal (DACT) utilizing C2PC, and the Army’s BFT solution, Force XXI Battle Command Brigade and Below

(FBCB2) that includes messaging standards, classification of data, and routing of information in a mobile tactical environment.

A strategy to accomplish convergence to a single capability consists of:

- Army migrating from their Maneuver Control System (MCS) to the Joint Tactical Common Operating Picture (COP) Workstation (JTCW), developed on the C2PC baseline, at echelons Brigade and above. Targeted fielding begins in FY06.

- USMC migrates to FBCB2-BFT application for echelons Brigade and below, while maintaining unique communications architecture when FBCB2 meets Marine Corps required capabilities.

Although improved BFT may help to reduce the likelihood of fratricide, BFT does not address all of the complex combat identification challenges posed by friendly fire on U.S. and coalition forces and civilian populations, including facilities and sensitive sites. The development of joint tactics, techniques, and procedures, along with integrated joint training, will be a key element in reducing the toll of these tragedies during future operations. The Marine Corps will continue to work with the Army and the other services to develop such joint solutions.

Improvised Explosive Device Working Group (IED WG)

The Marine Corps has formed an Improvised Explosive Device Working Group (IED WG). This group is examining tactics, techniques, and procedures (TTPs), as well as technologies, to defeat a serious threat to our forces. Our working group is closely tied to the efforts of a similar group formed by the Army to ensure that effective solutions are shared and disseminated. Based upon lessons learned from Marine and Army organizations that participated in OIF I, both in major combat and the ensuing security and stability operations (SASO), the

Marine Corps has devised a training program for deploying units. This training, conducted at March Reserve Air Base in Riverside, California, is designed to simulate the complex security environment that our Marines will find themselves operating in and to provide them with the tactics to accomplish the mission as well as protect the force. The training is conducted at multiple echelons from the battalion command group, and their function in command and control and intelligence, down to the most junior Marine, and his vital role in security. Both regular and reserve units have undergone this training. We plan to continue training units as they prepare to deploy, modifying the training as we continue to collect lessons learned from deployed units.

The Marine Corps' IED WG is also coordinating efforts with the Counter-Terrorism Technology Support Office, Technical Support Working Group (TSWG), an Office of the Secretary of Defense (OSD) sponsored interagency coordination cell. TSWG is working to deliver capabilities that counter the IED threat by attacking the source. They emphasize tactics, techniques, and procedures vs. technology reliance. TSWG is providing training support at no cost to the Marine Corps along with a number of other counter-IED initiatives.

Force Protection of units and personnel deploying from the Continental United States (CONUS)

Headquarters Marine Corps (Security Division) is actively involved in multiple program initiatives for the protection of our CONUS based personnel. The programs listed below comprise a holistic approach by focusing on Critical Infrastructure Protection; and Chemical, Biological, Radiological, and Nuclear protection for installations. These programs will ensure that the Marine Corps can effectively project the necessary force through prudent force protection of our homeports within CONUS.

These programs include:

- (1) The Joint Service Installation Pilot Project (JSIPP). This program entails installing Chemical and Biological Sensors aboard one Marine Corps' base (Camp Lejeune) (nine total DOD bases).
- (2) Unconventional Nuclear Warfare Defense (UNWD) Program. This is a pilot project to detect radiation at four DoD installations. Marine Corps Base Camp Lejeune was chosen as the host for JSIPP and the UNWD program giving Camp Lejeune a chemical, biological, and radiological detection capability. Funding for these programs stops in FY05.
- (3) The Guardian Program. This program is destined for 9 Marine Corps installations during FY05-FY09 to improve first response capability and assist in CBRNE detection capability.
- (4) Installation First Responder Program. This is an on-going Marine Corps response to Program Decision Memorandum 1-99 to improve the capability of all Marine installations to respond to a Weapons of Mass Destruction (WMD) event. Funding for this program was diverted to the Guardian Program.
- (5) Critical Infrastructure Protection (CIP) Program. Designed to support the combatant commander's (COCOM) operations plans (OPLANS). The effort is to ensure that critical infrastructure is identified and protected against loss or degradation. The Marine Corps shall identify, protect, and ensure the availability of those assets and infrastructure critical to the execution of its mission. We must recognize that mission assurance is highly dependent upon both Marine and non-Marine assets and infrastructure. Overall, CIP is designed to support the force projection platforms from which the operational forces will deploy from and/or protect those platforms from which they will deploy.

The CIP Program encompasses:

- (a) Program Management - individuals placed at each of the Marine Force Headquarters to develop, execute, and coordinate CIP policy and programs from HQMC and the Joint Staff.
- (b) CIP database enterprise architecture - Designed to provide a comprehensive tool which will enable those individuals responsible for CIP and related activities to identify critical assets, track current and future assessments, readily identify funding shortfalls, and then track funds from the source and date of issuance to its eventual execution.
- (c) Full Spectrum Integrated Vulnerability Assessments - The FSIVA encompasses Antiterrorism/Force Protection assessments, CIP related assessments, cyber assessments, and commercial interdependencies related to critical infrastructures which directly or indirectly support DoD installations and forces. FSIVA CONOPS and standards are currently in draft form.
- (d) CIP programs will have to be in future POM vice a program of record. In order to execute the requirements which will be leveraged on the Services and COCOMS as a result of the FISVA process and Assistant Secretary of Defense (HD) and Joint Staff Policy.

Improved Individual First Aid Kits (IIFAK)

The Marine Corps began fielding an IIFAK prior to OIF I. The current Individual First Aid Kit has not been improved in over 30 years and does not provide the life-saving medical technologies available today. The IIFAK dramatically enhances the life saving capability of the first responder on the battlefield. Historically, Marines wounded in action risked bleeding to

death or suffering with painful untreated burns before reaching more capable treatment facilities. The IIFAK, with advanced hemorrhage control and burn treatment capabilities, will improve personnel survival rates in combat. The Approved Acquisition Objective (AAO) for the IIFAK is 213,000 units to support FMF requirements, with 153,000 remaining to be procured. \$9M is currently unfunded.

Provide a description of the equipping initiatives for Marine Expeditionary Forces resulting from Army lessons learned in Operation Iraqi Freedom.

Equipping initiatives are based on lessons learned from both deployed Army forces and the requirements articulated and prioritized by the I MEF commander. Many of our equipment initiatives are a direct result of close coordination between Marine Corps Combat Development Command and the Army Rapid Equipping Force. We have procured and fielded significant enhancements for force protection capabilities for our forces deploying to OIF II.

As a direct result of our work with various Army commands and working groups, we are fielding armor and armor kits to harden over 3000 vehicles. We have modified the seating in our tactical trucks to allow Marines to face outboard and more quickly respond to a threat.

Due of the efforts of our IED Working Group, and the close coordination they have with the Army effort, we have procured counter IED equipment to aid in defeating what has become the weapon of choice for our enemies. We have concentrated our procurement elements first on survivability, then on detection, and finally on neutralization.

We are fielding auxiliary body armor to provide enhanced ballistic protection for our Marines.

Checkpoints can be vulnerable to attack. To reduce this vulnerability and to enhance our Explosive Ordnance Disposal capability we have leveraged the Army's experience and we are fielding Vehicle Barrier Nets as well as new detection capabilities such as x-ray machines, mine detection equipment, and robotics.

To improve the situational awareness of our commanders and individual Marines, we are fielding Position Location Information equipment as well as Combat Identification equipment to reduce the risk of fratricide. To assist our Marines in communicating with the Iraqi people, we have purchased and fielded hand held phrase translators and provided additional cultural awareness training.

The deployment of UAVs provided by the Marine Corps Warfighting Lab will significantly enhance the intelligence collection effort at the tactical level.

In addition, we are equipping our Marines with the Advanced Combat Optical Gunsight (ACOG) to improve their ability to locate, identify, and engage threats with greater precision and discretion.

We are also fielding new communication equipment such as the Multiband Inter/Intra Team Radio or PRC-148, which supports small unit leaders and convoy operations and the ability of our Marines to rapidly respond to threats. To enhance communications at the higher level, we are deploying aerostat balloons that are capable of acting as aerial relays in coordination with, and in part as a result of, the Army's efforts by the Rapid Equipping Force. In addition, we are exploring using these same balloons as surveillance platforms, mounting a variety of sensor systems to include infrared cameras. Additionally, there is a validated need for infantry Marines to be equipped with the Personal Role Radio for communication within the fire-team.

I have also directed the Marine Corps' Marine Combat Assessment Team (MCAT) to begin interviewing wounded Marines to consider, from their unique perspective, how their wounds may have been avoided or mitigated through fielding of better equipment or changes in tactics, techniques, and procedures (TTPs).

Finally, to ensure that lessons learned continue to be acted on rapidly and effectively, at the direction of the Secretary of the Navy, we have set up Operation Respond to provide a venue for deployed Marines to identify emerging OEF and OIF requirements and to provide a rapid response.

The MCAT continues to coordinate with the Center for Army Lessons Learned (CALL), and has actively pushed appropriate CALL products to the training organizations preparing USMC units for their return to Iraq, particularly on such high level issues as TTPs for countering ambushes, dealing with IEDs, and improvements to body armor, crew-served weapons mounts, combat optic weapons sights, and other equipment initiatives.

The Marine Corps also participated in the Joint Survivability (JSURV) effort and the Convoy Survivability Conference hosted by the Army Transportation School in late March 2004, and participates as a member of the Army Improvised Explosive Device Task Force. Members of our Forward Analysis and Collection Team are deployed to theater and will leverage the efforts of Joint Forces Command (JFCOM) and CALL teams. The Marine Corps is applying its experiences as well as those of the Army in OIF to guide its future efforts to "fine tune" and transform its forces.

Conclusion

In conclusion, I would like to again thank the members of the Committee for their continuing support of the Marine Corps, and for the opportunity to discuss our readiness issues.

The young men and women of your Marine Corps are doing an exceptional job in OEF and OIF. Their accomplishments are a direct reflection of your continued support and commitment to maintaining our Nation's expeditionary warfighting capability. We go forward with confidence because our Marines and Sailors have the best training and equipment in the world, thanks to the support of this Committee, and the Nation we proudly serve.

DOCUMENTS SUBMITTED FOR THE RECORD

APRIL 1, 2004

USMC FY08
Unfunded Programs List

APPROPRIATION
& PROGRAM TITLE

EXECUTIVE SUMMARY

Military Personnel, Marine Corps (IMPMC)

PROGRAM
AMOUNT
(\$M)

Program Title	Program Amount (\$M)
Increased train benefits	228.1
Operations & Maintenance, Marine Corps (OMMC)	338.1
Operational Maintenance	43.0
Operational Maintenance	13.5
Family of Marine Cold Weather Clothing & Equipment	24.0
Family of Cold Weather Clothing & Equipment	13.0
Family of Shelters and Tents, Command	23.4
Portable Tent Lighting	8.5
USMC Continuity of Operations (COOP)	3.0
Storage, Logistics Asset Management (SLAM) Program	42.5
Operations & Maintenance, Marine Corps (OMMC) Subtotal	154.2
Operations & Maintenance, Marine Corps (OMMC)	10.0
Operational Maintenance	9.4
Portable Tent Lighting	3.5

USMC FY06
Unfunded Programs List

Family of Shelters and Tents, Command Post, Large Program and Ultra Lightweight Camouflage Net System (ULCANS)	Funds advanced lightweight rapid deploying Large Command Post tactical shelters, which would reduce setup time by up to 50% and would provide "open architecture" that is more compatible with C4i and Medical system requirements. Would also fund the next-generation Ultra-Lightweight Camouflage Net System (ULCANS) provides reduced probability of visual detection enhanced thermal and radar signature suppression and improved background matching. Additionally, ULCANS has many other advantages over the current system, including less water retention (50 pounds lighter and has a less complex one piece shape design)	9.2
Facilities Sustainment, Restoration and Modernization (FSRM) Restoration and Modernization for 35 sites and Marine-use spaces in joint reserve centers	Funding reduces the backlog of high priority restoration and modernization projects that have not been funded due to higher priority requirements. The Marine Corps Reserve must fund restoration and modernization for 35 sites and Marine-use spaces in joint reserve centers	3.1
Strategic Logistics Asset (SLAM) Program	Funds Marine Corps Reserve equipment, maintenance and testing/assessment requirements for the Strategic Logistics Asset Management (SLAM) Program. The Strategic Logistics Asset Management (SLAM) program will significantly improve force readiness by ensuring that Nuclear Biological Chemical Defense Equipment (NBCDE) is properly maintained, calibrated and deploying forces are provided the appropriate type and quantity of NBCDE. The Marine Corps Reserve Consolidated Storage Facility will be located at Ft. Worth, TX.	2.8

Operations & Maintenance, Marine Corps, Reserve (OMMCR) Subtotal

33.0

Procurement Ammunition, Navy/Marine Corps (PANMC)

Ammunition required for phase one standard of two new Infantry Battalions as part of the Force Structure Review Group (FSRG) initiatives implementation. Additional Ammunition requirements exist in phase two in FY06 for \$12.2M		20.3
Fuze, Electronic, Time, M762A1 (DDCIC NA17) is used with projectiles carrying payloads that are expelled during projectile flight (airburst). It is fired from the M108 155mm Medium Towed Howitzer. Funds \$0.050 fuze and increases procurement from 1% to 23% of the acquisition objective		10.0
The Igniter, Time Baiting Fuze M81 (DDCIC MN81) is a pull-type assembly used to initiate time baiting fuze and shock-tube assemblies. Funds \$05 800 Igniters and increases procurement from 46% to 91% of the acquisition objective. This munition is currently experiencing an extremely high rate of expenditure in support of the GWOT and the additional funding will ensure proper munitions inventory		5.0
The Destructor, Non-Electric MK154 (DDCIC MN52) is the replacement for the Destructor, percussion MK123 (DDCIC MM65). It is used where a non-electric waterproof application is desired. Funds 108,600 Destructors and increases procurement from 4% to 86% of the acquisition objective. This munition is currently experiencing an extremely high rate of expenditure in support of the GWOT and the additional funding will ensure proper munitions inventory		10.0
The Rocket High Explosive, 66mm (M72A7) (DDCIC HA39) is a lightweight, single shot, disposable weapon optimized to defeat lightly armored vehicles and other hard targets at close combat ranges. Funds 4,534 Tactical Rockets (HA39) and 25,716 Trainer Rockets (HA21) and 280 training launchers. This round was recently identified as an urgent requirement for use in support of the GWOT		11.0
The M102 Multi-Option Fuze for Artillery (MOFA) (DDCIC MA09) is compatible with all current 155mm burning type artillery projectiles. It is fired from the M108 155mm Medium Towed Howitzer and is used to support Marine units currently engaged in the GWOT and additional funding will ensure proper munitions inventory		6.0
The XM1028 120mm Canister Train Cartridge (DDCIC CA38) is a 120mm Canister Cartridge of 11500 Canister balls that are expended upon muzzle exit. There is no fuse on the round. Funds 2,381 XM1028 (DDCIC CA38) and increases procurement from 4% to 33% of the acquisition objective. This round is being used to support Marine units currently engaged in the GWOT and additional funding will ensure proper munitions inventory		3.0
The M755 is an extended range 155mm High Explosive (HE) projectile (DDCIC 0039) designed to reliably augment and ultimately replace the currently fielded 155mm HE Projectile M107. Due to the M755's increased range, lethality, and accuracy it is considered a critical requirement for the Marine Corps. Funds 40,000 projectiles and increases procurement from 44% to 52% of the acquisition objective. This round is being used to support Marine units currently engaged in the GWOT and additional funding will ensure proper munitions inventory		15.0
The Cartridge, Caliber 50.4 API MB1 API-T M20 Limited (DDCIC A276) is used in M2, 50 caliber Machine Gun against armored targets. Funds 5,852,774 rounds and increases procurement from 53% to 100% of the acquisition objective. This munition is currently experiencing an extremely high rate of expenditure in support of the GWOT and additional funding will ensure proper munitions inventory		13.0
The Cartridge, 7.62mm x Ball MB07 Train M62 Limited (DDCIC A131) is mainly used in the M240 Machine Gun against personnel and unarmored targets. Funds 3,333,333 cartridges and increases procurement from 89% to 100% of the acquisition objective. This munition is currently experiencing an extremely high rate of expenditure in support of the GWOT and additional funding will ensure proper munitions inventory		1.5
The 40mm M430 HEDP Cartridge (DDCIC B542) is used in the Mk19 Mod 6 Grenade Launcher (GLNG). Funds 143,038 cartridges and increases procurement from 18% to 32% of the acquisition objective. This munition is currently experiencing an extremely high rate of expenditure in support of the GWOT and additional funding will ensure proper munitions inventory		30.0
The 120mm High Explosive Airburst, Multi-purpose with Tracer M204A1 cartridge (DDCIC C791) is a large enhancement over its predecessor, the M830, which has been in the U.S. inventory since the early 80s. HEAT cartridges have multi-purpose warheads that are used to defeat armored vehicles, helicopters and soft targets such as bunkers. Funds 1,500 cartridges and increases procurement from 27% to 76% of the acquisition objective (IAO). This munition is currently experiencing a high rate of expenditure in support of the GWOT and additional funding will ensure proper munitions inventory		10.0
Charge Demolition, Linear High Explosive (HE), Composition C4, Misk with Fuse, Electric, M1134A (DDCIC M613) is used to clear a path through minefields and obstacles. Funds 304 Linear Demolition Charges and increases procurement from 63% to 96% of the acquisition objective		10.0

Procurement Ammunition, Navy/Marine Corps (PANMC) Subtotal

144.8

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USMC FY06
Unfunded Programs List

Communications & Control System DATA DISTRIBUTION and Facsimile Set	Increased reliance on Reserve capability in the prosecution of the GWOT has highlighted equipment shortfalls in our Reserve Forces. In the past this has been an area of redundancy assumed via current GWOT operations and commitments have made this risk unacceptable. The request represents the difference between authorized and on hand for USMC equipment.	4
Practical towers & utility trucks	Increased reliance on Reserve capability in the prosecution of the GWOT has highlighted equipment shortfalls in our Reserve Forces. In the past this has been an area of redundancy assumed via current GWOT operations and commitments have made this risk unacceptable. The request represents the difference between authorized and on hand for USMC equipment.	0
MTRV (7 TON)	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	1.4
AVIATION REFUELER	Increased reliance on Reserve capability in the prosecution of the GWOT has highlighted equipment shortfalls in our Reserve Forces. Funds would be used to procure a total of 11 ARCS to be left and M3. \$33.0M procures two (2) Hardened Engineer and EOD teams. The full can carry up to 12 Engineers. There is an NBC overpressure system along with cargo spaces for chests and a variety of other equipment. The request represents the difference between authorized and on hand for USMC equipment.	2.1
Family of Tactical Trainers	Increased reliance on Reserve capability in the prosecution of the GWOT has highlighted equipment shortfalls in our Reserve Forces. Funds would be used to procure a total of 11 ARCS to be left and M3. \$33.0M procures two (2) Hardened Engineer and EOD teams. The full can carry up to 12 Engineers. There is an NBC overpressure system along with cargo spaces for chests and a variety of other equipment. The request represents the difference between authorized and on hand for USMC equipment.	2.2
Hardened Engineer Vehicle (Cougar)	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	30.0
Environmental Control Equipment (ECE)	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	7.0
Bulk liquid containers	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	2.4
Power 1 Battery Aiming	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	1.0
NBC Recon SYS TEMALIN Purpose	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	2.0
Decommunication System	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	1.0
PCS-18 Metal Detector and other items	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	1.0
Container	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	4.0
Construction Equipment	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	0.1
SURVEYING SET GEMER	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	0.1
Tactical Radios	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	26.0
ULTIMATE BULL DOG Mined a chassis	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	0.4
Lightweight Vehicle Replacement System	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	7.0
TPS 39 Radar	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	7.5
Marine Air Command and Control System (MACCS) Settlement	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	5.0
JTRS Legacy Budget Enhanced Position Location Reporting System (EPLRS) AN-930-2C (V) 2	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	17.9
Fire Support Settlement	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	5.8
Light Weight Prime Mover (LWPM)	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	24.0
TOWED Infrared Monitors (IM) Camera	These are required for transport of Marines and equipment during field training evolutions. Procures an additional 7 MTRVs essential for logistical support of the unit which will divide into multiple teams and disperse over long distances.	2.1

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USMC FY06
Undunded Programs List

USMC FY06 Undunded Programs List		Military Construction, Naval Reserve (MCNR) Subtotal	
Memphis, TN, P-030 Reserve Training Center (RTC) and Vehicle Maintenance Facility (VMF) at Naval Support Activity (NSA) Mid-South Memphis, TN for Kilo Company, 3rd Battalion, 23rd Marine Regiment. Current facilities, built in 1982, are inadequate in size, lack functionality, and require substantial repair due to disapidated conditions.	7.6		
Military Construction (MCNR)		26.0	
MCB Camp Pendleton, P-331 CEB Migration to HOBEN	5.0	This project constructs facilities that will accommodate the migration of 1st Construction Engineering Battalion, Utilities Platoon to Headquarters Battalion 1st MARDIV in the Margaria (33) Area	
MCB Camp Pendleton, P-035 LAR Company	7.9	The project supports the Force Structure Review Group initiatives implementation for FY06. Provides adequate and efficiently configured facilities to accommodate the operational and training requirements of a Light Armored Reconnaissance Company. The project supports the Force Structure Review Group initiatives implementation for FY06.	
MCB Quantico P-519, SNCO Academic Facility	6.2	Constructs a new academic facility to accommodate up to 300 Staff Non-Commissioned Officer (SNCO) Marines	
P-003 Bount Island Command, P-003, Main Gate Security Improvements	4.3	Project constructs adequate space to allow for proper processing of personnel, vehicle registration and inspections by the Provost Marshal's office. There is currently no secure main entrance to Bount Island Command.	
MAGTFIC 29 Palms, P-686, BEG	30.0	Provides 384 living quarters for bachelor-enlisted personnel (132 two-person rooms) using the 2-10 standard room design for permanent party assigned personnel. Provides 625 parking spaces in a parking garage and 150 additional parking spaces on adjoining parking lots for the existing and planned bachelor enlisted personnel.	
MCAS Yuma, P-501, Fire Station	9.4	Constructs a fire station for fire trucks and local fire missions at MCAS Yuma. A fire station from the project site is the family housing, Air Station and airfield areas to the north, and the relocation of the existing flight line located on the project site is land recently acquired to the south area of the station.	
MCAS Beaufort, P-431 NBC Facility	1.9	This project constructs a new Nuclear, Biological, Chemical (NBC) training facility with a classroom building, laboratory building, and a gas chamber for practical instruction. Provides a laboratory building, classroom building, and a gas chamber for practical instruction. Provides a laboratory building, classroom building, and a gas chamber for practical instruction. Provides a laboratory building, classroom building, and a gas chamber for practical instruction.	
MCB Camp Lejeune, P-020, NETS	6.4	The project constructs an equipped Automated Infantry Squad Battle Course (ISBC) on the existing G-10 range. The range will support live-fire and maneuver for the infantry squad with static and moving targets and performance feedback.	
MCDC Quantico P-443, Mess Hall	13.0	Provides dining facility addition to accommodate proper food preparation and storage space to meet increased mission requirements.	
MCDC Quantico P-443, Mess Hall	6.1	Project constructs a centrally located dining facility in order to provide cafeteria-style dining for regular meals, short-order meals, and fast food service to support permanent party and recruits going through Basic Training at MCDC San Diego.	
MCB Hawaii, P-774, PTA Storage	7.8	The project constructs an equipment storage facility with maintenance bays at the Pukalani Training Area (PTA) on the Big Island of Hawaii.	
MCB Camp Lejeune, P-1063, MOUT Enhancements	10.9	Project will enhance the existing Urban Training Area with 50 additional multi-story training structures. New structures will be designed to accommodate audio and video displays, remotely controlled room and mannequin heads. The new urban training area will be designed to allow live scenarios. Building 20 will be modified to provide two control rooms, an equipment support room and mannequin heads.	
MCB Hawaii, P-816, Waterfront Ops Facilities	10.6	A standard waterfront operations building is required to support the Ship Movement Office to perform the listed missions by conducting such functions as maintenance and repair of small craft including small electronic systems, and providing such facilities as a duty crew bunk room, crew's lounge, boat's locker, space for storage of boat gear and paint, oil spill equipment and a battery charging room. The facility also requires a boat ramp to pull boats from the water onto land and into the building.	
MCAS Camp Pendleton P-070, Hangar	3.6	This project constructs second story additions to three aircraft hangars for helicopter squadron administrative space requirements. Additions will be constructed on top of existing completed first story additions.	
MCDC San Diego, P-293, Recruit Support Barracks	15.3	The current briefing facilities cannot meet the demand of spaces required to recruit recruits. Furthermore, medical rehab and physical conditioning Platoon recruits stay an average of 2-3 weeks longer than the typical recruit, thus placing additional demands upon the recruit briefing requirements. The briefing requirements of Physical Conditioning Platoon (PCP), Medical Rehab Platoon (MRP), and Basic Marine Platoon (BMP) include individualized training areas to strengthen, condition, and rehabilitate recruits in order to return them to a standard level of fitness. Interaction between the PCP/MRP/BMP drill instructors and medical personnel is essential to the success of the program. The project will provide a standard briefing facility for the regular training of all basic recruits. The project will provide a standard briefing facility for the regular training of all basic recruits. The project will provide a standard briefing facility for the regular training of all basic recruits.	
MCB Beaufort, P-438, Engine Dynamometer Facility	6.2	Project provides a facility to accommodate the off-line and on-line dynamometer testing of engine components. The existing dynamometer testing facility is located in the existing engine test facility and has no protection from inclement weather. The tests are covered with canvas and there are no door enclosures. In addition, two Powertrain Dynamometers are too large to be moved to the area they are installed in creating a safety hazard.	
MAGTFIC 29 Palms, P-602, Student Processing Center	2.2	The project is needed to provide a consolidated, efficiently configured, processing center and adequate temporary housing for newly arriving junior enlisted students.	
MCDC Quantico, P-546, Student Quarters 1B5 (Ph 1)	21.1	Provides adequate housing for 250 officers undergoing initial training. The Basic School (1B5) Quarters, Virginia. All Marine Officers, regardless of accession source, are trained at 1B5. Project would alleviate housing shortage where average on board student density is 1,473 sq ft per trainee by providing method of 1,600 students.	

USMC FY08
Unfunded Programs List[illegible]

USMC FY06
Unfunded Programs List

CH-53E EAPS Barrier Films	Funds non-recurring engineering to improve H-53 Engine Air Particle Separator (EAPS) using barrier filter technology in place of the current vortex tube-based separation system. This effort would develop a qualified replacement EAPS engine procurement and fielding could align with standard maintenance replacement of existing EAPS.	5.0
H-53E Nacelle Replacement	Provides non-recurring engineering for improved durability engine nacelles for CH-53E and MH-53E helicopters and procures 30 trip-sets	5.0
Aircraft Procurement, Navy (APN) Subtotal		265.1
Other Procurement, Navy (OPN)		
ATNAVICS Operation Subsystem / Communication Subsystem (OS/CS) Shelters	The USMC requires 4 operator positions for its ANITRN-3T Air Traffic Navigation Integration Control/Coordination System (ATNAVICS). The current US Army based ATNAVICS configuration consists of a HAMWV-mounted Sensor Subsystem and a HAMWV-mounted Operation and Communication Subsystem (OS/CS) with 2 air traffic control operator positions. This effort funds additional OS/CS for each of 2 ATNAVICS systems being procured.	6.0
ANITRN-41 TACAN	The ANITRN-41 provides a non-portable, high-weight Tactical Air Navigation (TACAN) beacon that is easily transportable to remote landing sites and forward area re-arrival fuel pads via HAMWV. This TACAN provides aircraft non-precision approach capability for forward expeditionary operations. This requirement developed from QVOT lessons learned. The ANITRN-41 is a QOTIS dem currently fielded within the U.S. Air Force that includes all logistics support.	9.3
Other Procurement, Navy (OPN) Subtotal		15.3
Weapons Procurement, Navy (WPN)		
Headline II Procurement	Procures 1300 AGM-114K/A weapons which represents approximately 4 years of current combat expenditures. Will allow addressing of AGM-114K shortages in time to re-stock the Armed Forces inventory. This program is a joint effort with the US Navy and US Air Force. Criticality low inventories exacerbated by termination of Joint Common Missile program. Unable to meet current combat requirements for the basing variant if production does not begin in FY06.	122.0
Pioneer UAV Engines and Modular Avionics Integrated System (MAIS)	Funds procure an additional 12 UEL74T engines and 12 Modular Integrated Avionics Systems (MAIS) for the Pioneer. OIF operators are placing an additional burden on the Pioneer program, with the flight hour rate reaching four times the peacetime allocation. The current procurement funding, a inadequate to meet operational commitments, and is exacerbated by the lead-time required to procure Engines and MAIS.	6.7
Weapons Procurement, Navy (WPN) Subtotal		128.7
Ship Procurement, Navy (SCN)		
LHA (R)	Advance procurement for LHA(R). AP would accelerate efficient construction providing for rapid development and fitting of this transitional platform with transformational capabilities	417.0
Ship Procurement, Navy (SCN) Subtotal		417.0
Green \$ Subtotal		2053.7
BISOG \$ Subtotal		829.1
Grand Total		2882.9

**QUESTIONS AND ANSWERS SUBMITTED FOR THE
RECORD**

APRIL 1, 2004

QUESTIONS SUBMITTED BY MR. WELDON

Mr. WELDON. Your statement provides key measures of financial health for U.S. aerospace companies. Please provide similar data for European representative aerospace companies.

Ms. PATRICK. For a representative set of selected European aerospace/defense firms (EADS, BAE Systems, Finmeccanica, Thales and Rolls Royce), a simple average of these firms' performance by the same measures over the same period falls short of U.S. industry.

Operating margins at the end of 2003 were about 50% percent lower than the U.S. industry, averaging 4.8% vs. 10.3% for the S&P A/D Index. Return on invested capital likewise lagged slightly at 5.2 percent, versus a 6 percent return of the S&P A/D Index. The P/E ratio for the European firms at the end of 2003 was about 11.7, well below the U.S. A/D industry P/E ratio of 35, indicating a far less optimistic market outlook for future performance. Finally, debt service capacity measured as interest coverage is about 2.6x for the European firms, much lower than the S&P A/D Index at 6.6x, indicating a higher degree of leverage and financial risk.

Taken together, these observations highlight a disparity in fundamental performance and financial condition, but do not necessarily mean that the European Aerospace/Defense industry is in poor financial health.

Mr. WELDON. How will capabilities based decision-making fundamentally change the defense enterprise, as asserted on page 1 of your written statement?

Ms. PATRICK. Capabilities based decision-making brings with it a clear warfighter focus, the full operational context which must be considered in defining the solution, a decision framework for trading operational options, and a common vernacular for all involved parties. The impact of each of these to the defense enterprise is summarized here:

Warfighter Focus. Capabilities-based decision-making keeps the end result in the forefront of the process. The decision process ultimately affects the warfighter and this impact should be central to making acquisition decisions. By focusing on the broader warfighter needs versus specific Service needs, larger market opportunities are opened to defense enterprises.

Full Context. The capabilities framework brings with it a fully developed context in which to consider decisions. Providing industry the full context within which their products will operate offers industry opportunities to present alternative innovative solutions; solutions which a single Service may not have considered. It also affords industry the opportunity to more easily apply myriad applications of analogous technology across functional concepts and Service-specific platforms/systems. Such an innovative business climate helps to strengthen the U.S. industrial base.

Decision Framework. Capabilities-based decision-making provides a trade off framework that can be used to evaluate disparate options based on evaluating impacts on a common result—the warfighter capability. Unencumbered by individual Service bias, capability-based decision-making will allow DoD to more easily think of broader solution sets, and a broader field of solution providers. In the future, we could more readily think of loitering unmanned aerial vehicles competing with space-based communications relays. Directed energy weapons could compete with bombs. Hypersonic strike could compete with aircraft carriers. In contrast, decisions in the past have often been made without considering dissimilar alternatives—options that could be evaluated along common performance parameters can now be considered. This increased trade space will act as an incentive for industry to be innovative while providing clear on-ramps to the defense market for new offers.

Common Vernacular. Capabilities-based discussions can span program stovepipes as well as bridge the gap between the acquisition, requirements, and operations communities by using a common way to discuss the Department's needs and solutions—opening larger market opportunities than a single Service acquisition would provide. Applied in a global and commercial context this common vernacular provides a translation of warfighter capabilities into the technology and industry vernacular familiar to industry, allowing a clearer communication of the Department's capability goals.

Overall, capabilities based decision-making offers the Department an opportunity to convey what is needed and how it will be used while allowing industry to be innovative in offering solutions that serve a broader market.

Mr. WELDON. With regard to the "cartel-like" nature of the rotorcraft industrial base described in your statement, what actions were taken to change the factors that led to the cartelization of the industry to preclude the same anti-competitive practices emerging again with the Army's cancellation of the Comanche and diversion of a large part of the Comanche funds for remanufacture programs? What production efficiencies and remedial action have been instituted that will assure virtually guaranteed remanufacture contracts do not again lead to runaway program costs?

Ms. PATRICK. The term "cartel-like" describes the unintended consequences of—in effect—allocating production among the three U.S. helicopter companies that's resulted from strategies which remanufactured legacy platforms through sole-source contracts to the original equipment manufacturer rather than full and open competition for new designs.

Funds made available due to Comanche's cancellation have provided the Department the opportunity to return to a competitive acquisition process. Examples are the Army's Armed Reconnaissance Helicopter (ARH) and Light Utility Helicopter (LUH) competitions that are being put into place. In addition, the Navy also sponsored competition for the acquisition of the Presidential Helicopter (VXX). The Air Force's Personnel Recovery Vehicle (PRV) will provide another opportunity in the near future to stimulate competition. These programs will help stimulate innovation within the U.S. industrial base and also result in a strengthening of their global competitive positions.

Not all helicopter programs can be competed due to operational demands. The Department still has to manage a number of remanufacturing programs, such as the UH-1, AH-1, and CH53 for the Marine Corps and CH-47, UH-60, and AH-64D for the Army. The Department has modified the UH-1, CH-53, and CH-47 programs from being remanufacture programs to being new build of existing design programs for two reasons: 1) combat losses have reduced the number of UH-1 and CH-47 aircraft available for induction into remanufacturing production lines; and 2) the cost of remanufacturing the UH-1, CH-53 and the CH-47 airframes have risen to a level equal to building a new airframe. Building new airframes removes many of the "unknown variables" which have plagued our remanufacturing efforts and caused unforeseeable cost growth, it also allows our deployed forces to continue to using their legacy assets longer.

Finally, the Department continues to work closely with industry to institutionalize Earned Value Management and Lean manufacturing across this sector. Unfortunately, there is no way to guarantee that the acquisition of complex weapon systems will not run into technical challenges or that changing requirements will not result in the need to change the programs and their associated costs. However, the Department is taking advantage of competition wherever possible in order to re-establish a more vibrant, responsive, and innovative industrial base.

It is through all the actions discussed above that the Department feels it can best control costs while obtaining the best weapon systems for the warfighter.

Mr. WELDON. Is there a national aerospace policy? If so, please provide.

Mr. BOGOSIAN. U.S. aerospace policy is a function of numerous public policy issues, including those concerning aerospace research and development; air transportation services economics and infrastructure; workforce development; regulatory oversight, particularly to ensure air transportation safety and security; international trade and foreign policy; space exploration, transportation and other services related to space; the development and acquisition of military aircraft, missiles, and other aerospace weapons; and antitrust considerations.

U.S. Government agencies work together to actively promote a robust and competitive U.S. aerospace industry. These agencies include the Departments of Commerce, Defense, Justice, Labor, State, Transportation, and the Treasury; the Federal Aviation Administration; the Federal Trade Commission; the International Trade Commission; the National Aeronautics and Space Administration; the National Science and Technology Council; and the Office of the U.S. Trade Representative.

Most recently, the Commission on the Future of the United States Aerospace Industry took a holistic view at the entire breadth of the many issues mentioned above and made certain policy recommendations organized under nine chapters. These chapters deal with an aerospace "vision", air transportation, space, national security, government, global markets, business, workforce and research.

My agency, the International Trade Administration of the Commerce Department, is concerned particularly with aerospace trade policy.

U.S. policy on trade in civil aircraft reflects the fundamental principles underlying U.S. trade policy in general. The United States seeks to achieve the exercise of free market forces to the greatest extent possible in the context of reciprocity between trading partners. Provisions of the Uruguay Round Agreements Act (PL 103-45) specific to civil aircraft (Section 135(c)) prescribe U.S. objectives in civil aircraft trade negotiations conducted in the World Trade Organization (WTO). These provisions call for the United States to obtain competitive opportunities for U.S. exports "substantially equivalent" to those afforded foreign products in the United States. Further, the United States will maintain "vigorous and effective" disciplines on subsidies practices and seek to eliminate tariff and non-tariff barriers to trade in civil aircraft.

A key objective of U.S. civil aircraft trade policy is to promote greater opportunities for U.S. exporters by reducing or eliminating market access and investment barriers abroad. The United States has encouraged countries seeking to accede to the WTO to become a signatory to the WTO Agreement in Trade in Civil Aircraft. While the opening of markets outside the United States for U.S. manufacturers and other U.S. exporters of civil aircraft may provide benefits to European competitors also seeking access to those markets, the United States does not seek preferential treatment for U.S. companies. For example, in concluding a 1996 bilateral Aircraft Market Access Memorandum of Understanding with Russia, the United States received certain market access commitments regarding "non-Russian" (and not "U.S.") aircraft.

Mr. WELDON. What is the European aerospace policy? Please provide.

Mr. BOGOSIAN. In contrast to the U.S. Government, European governments have a direct financial interest in their aerospace manufacturers. In the past, the largest European aerospace manufacturers were either entirely or largely owned by governments. This legacy continues today, with some government ownership of the major industry players. In addition to their ownership of equity, European governments provide "equity infusions" to boost aerospace manufacturers' operating capital and extend government "loans" contingent upon the manufacturers' success in the marketplace.

Certain practices of European governments observed by the United States may or may not reflect an aerospace "policy". These practices include using countries' pending accession to the European Union as political leverage aimed at increasing the sale of European aerospace products to those markets, at the expense of competing U.S. suppliers. Another practice has been the pursuit of regulatory measures, such as the EU aircraft noise "hushkit" regulation, that discriminate against U.S. products. The United States has taken action to oppose such practices, such as by initiating legal proceedings in the International Civil Aviation Organization that led to the withdrawal of the EU hushkit regulation.

The most recent expression of European policy encompassing the totality of the aerospace sector is the *Strategic Aerospace Review for the 21st Century* (STAR-21). Released in July 2002, this statement was prepared by European Commissioners and heads of large European aerospace manufacturers. Among its key recommendations, STAR-21 calls for fair competition in world markets, the provision of €100 billion over 20 years from public and private sources for aerospace research and technology, EU preeminence as a regulator of civil aviation, greater coordination in the EU of defense requirements and procurement, and adequate funding for European space initiatives.

Mr. WELDON. Please indicate the number of times the interagency group established to address the recommendations of the Commission on the Future of the U.S. Aerospace Industry report has met and the Commerce-action/policy actions taken or intended to be taken as a result of these meetings.

Mr. BOGOSIAN. International Trade Administration (ITA) and other Commerce Department representatives meet regularly with other federal agencies and the private sector through participation in multiple interagency initiatives that address recommendations of the Commission on the Future of the U.S. Aerospace Industry. Following are updates to some of the activities discussed during the Committee hearing:

Space: ITA staff participate in the White House Space Policy Coordinating Committee which is reviewing and revising U.S. federal space policies. Four new policies have been signed by the President over the last two years.

Air Transportation: The Commerce Department contributed to development of the Integrated Plan for the Next Generation Air Transportation System submitted to Congress in December of 2004. Commerce participates in the Senior Policy Committee chaired by the Secretary of Transportation, and staff from multiple bureaus participate in the integrated product teams outlined in the plan and coordinated through the Joint Planning and Development Office.

International Trade: The Commerce Department is participating in inter-agency reviews of multiple international trade agreements and policies affecting the aerospace industry (discussed in more detail in answers to questions four and six.)

Workforce: ITA staff participate in an interagency aerospace workforce revitalization task force coordinated by the White House Office of Science and Technology Policy. Among other things, the task force is assessing state workforce programs with a view towards expanding the most successful of them (such as a particularly beneficial aerospace mentor program in one state) to other jurisdictions.

Research and Development: ITA staff participate in the review of Administration policies on aeronautical research and development through the National Science and Technology Council's Aeronautics Science and Technology (S&T) Subcommittee. Subcommittee working groups currently are assessing federal S&T priorities, infrastructure, policies and related activities across relevant federal agencies.

Mr. WELDON. Please provide in as much detail as is available the degree to which foreign government market intervention in subsidies, tax policy, anti-competitive restrictions, biased standards and regulations, and export financing has disadvantaged U.S. companies and what has been done to correct these actions.

Mr. BOGOSIAN. The International Trade Administration (ITA) of the Commerce Department is involved in a wide variety of activities to address foreign government policies that have a competitive impact on U.S. aerospace companies. The nature and extent of such policies are catalogued in regular reports developed by Commerce and other federal agencies. ITA also is concerned about other government policies not outlined in these reports, such as aerospace-related standards and technical regulations used by foreign governments as trade barriers.

The *Annual National Trade Estimate Report on Foreign Trade Barriers*, developed by the Office of the U.S. Trade Representative and the Commerce Department, describes current trade barriers of concern to the Administration across all industries, including the aerospace manufacturing industry. For example, European government subsidies to Airbus and other European aerospace manufacturers are discussed. The *Annual Report to Congress on Subsidies Enforcement*, also jointly published by Commerce and USTR, describes specific subsidy programs being investigated by the Administration as well as steps taken to defend U.S. laws and regulations such as the European Union challenge before the World Trade Organization of the U.S. Foreign Sales Corporation rules. The *annual Report to the U.S. Congress on Export Credit Competition and the Export-Import Bank of the United States* describes the role of government supported export financing in global aircraft sales and U.S. Government actions intended to ensure fair and open competition.

The Commerce Department is engaged in a wide variety of activities to address these barriers to aerospace-related trade. For example, we are seeking to eliminate aerospace-related subsidies that distort global markets through bilateral negotiations as well as consultations with European governments under the auspices of the World Trade Organization Agreement on Subsidies and Countervailing Measures. We also are working with other federal agencies to revise provisions governing officially-supported export credits through discussions with governments of other major aerospace-exporting countries. Commerce Department aerospace industry experts participate in development of global aerospace-related standards and recommended practices to ensure U.S. economic interests are fully considered, and these experts consult regularly with U.S. companies and foreign governments to address specific standards and regulations that distort competition.

Additional details on these and other trade policy issues, as well as U.S. Government activities to address them, will be provided in a forthcoming Commerce Department Report on Aerospace Market Developments and Government Policies. This report, prepared in consultation with the Department of Transportation and other federal agencies, is anticipated to be completed in early 2005 and will be made available to the U.S. House of Representatives Committee on Armed Services upon completion.

Mr. WELDON. The Commission Report concludes that federal acquisition policies currently fail to adequately protect commercial entities' intellectual property and inhibit providers of commercial products from doing business with the government. Does Commerce agree? If so, what is being done to correct this?

Mr. BOGOSIAN. In the typical Government contract, although the contractor has the right to own its inventions, the Government has some minimum rights. The Government's rights include a royalty-free license and the right to intervene if the company is not commercializing the invention. In addition, the Government may have unlimited data rights if it is fully funding the development. Those data rights,

however, are defined primarily by contract and procurement regulations pursuant to several statutes.

In the Department of Commerce, the Technology Administration (TA) handles intellectual property rights policy issues. When officials from TA have testified on this subject, they have found that the law that covers contractor inventions, the Bayh-Dole Act, has an appropriate balance of public and private rights. This is consistent with the 2003 report from the President's Council of Advisors on Science and Technology, which recommended no change in Bayh-Dole.

It is not clear that federal acquisition policies and statutes necessarily fail to protect commercial entities' intellectual property. This is because those policies implement the Bayh-Dole Act, which allows all contractors to own their inventions made with Government funds. Certain agencies may, under separate authorities (e.g., NASA under the Space Act and the Department of Energy under the Atomic Energy and Federal Non-Nuclear Acts) take title to inventions of large business subcontractors, subject to waiver requests. We understand that some companies may be unwilling to accept Government contracts because of the minimum rights the Government would receive in any contractor invention. These rights include the free license for Government use and march-in rights for any invention which is not being commercialized by the contractor. These rights are required by statute in 35 USC 210) and so the law must be changed to allow for the acquisition policies to change.

Mr. WELDON. On page four of your testimony you assert that aggressive pricing and financial support of European governments have compounded U.S. competitiveness challenges. (A) Please provide detail on Airbus' aggressive pricing practices and European financial support to Airbus. (B) What has the U.S. done to correct this? (C) Also please provide any objective comparative information regarding U.S. and European subsidies to their defense and commercial aerospace industries.

Mr. BOGOSIAN. The cited testimony refers specifically to the effect of Airbus' aggressive pricing and government financial support, among other factors, on Boeing's civil aircraft deliveries. The following replies focus on the large civil aircraft sector.

(A) Since the 1970s, Airbus has received billions of dollars in subsidies through launch aid, debt forgiveness, equity infusions, questionable export financing, grants and the provision of aircraft manufacturing infrastructure. With regard to just one type of these subsidies—launch aid—European Union Member State governments collectively have provided over \$15 billion. (Source: *Trade Facts*, October 6, 2004, issued by the Office of the U.S. Trade Representative.) Launch aid is funding that helps Airbus develop new aircraft models. Airbus has received launch aid for every civil aircraft it has produced.

Repayment of launch aid is contingent upon the commercial success of the aircraft program for which the subsidy was provided. It shifts the risk of entering a new aircraft into the marketplace from Airbus to European governments and their taxpayers. By lowering its risk exposure, Airbus is able to command lower interest rates on any funds that it does borrow to launch new aircraft or for other purposes. The U.S. Government has never provided launch aid to Boeing.

Details on Airbus and Boeing's sales prices are highly proprietary. For both manufacturers, it is widely accepted that actual sales prices of large civil aircraft can be significantly lower than so called "list" prices. Boeing's list prices are publicly available. Airbus' are not. Anecdotal information points to significant discounting of Airbus aircraft. For example, various press reports indicated that the first customer of the Airbus A380, Singapore Airlines, received a discount of between 30% and 40% from the list price of that aircraft (\$216 million) in effect at the time of the order (July 2001).

The problem is that the infusion of subsidies such as launch aid into one of two competitors can have an impact on the comparative final sales prices. Moreover, the same government funding can allow the subsidized competitor to offer non-price incentives, such as extremely favorable performance guarantees, that are beyond the non-subsidized competitor's ability to offer.

(B) In August 2004, President Bush made a public commitment to ending the subsidization of Airbus. The Administration has acted vigorously towards that end.

Because the European Commission had declined to enter into negotiations on this issue, the United States initiated proceedings in the World Trade Organization (WTO) in October 2004 that may lead to establishment of a dispute settlement panel being asked to rule on a U.S. petition that Airbus subsidies are WTO-illegal. Also in October 2004, the United States abrogated the 1992 U.S.-EU Agreement on Trade in Large Civil Aircraft because—as provided for in the agreement—the European Union failed to comply with its terms.

In January 2005, the Office of the U.S. Trade Representative (USTR) announced that the European Commission had agreed to enter into discussions aimed at concluding a new aircraft trade agreement within three months with the objective of

ending subsidies to large civil aircraft manufacturers. The EU stated that it agreed to a standstill of any new subsidies to Airbus during the negotiating period.

While the Administration welcomes this development, we are mindful of the difficult negotiations we face and that any negotiated solution to this issue will require compromises in both the European Union and the United States. In the meantime, seeking action in the WTO remains an option.

(C) USTR is coordinating the Administration's actions regarding Airbus subsidies. USTR has posted on its web site detailed information, attached, concerning subsidies to Airbus and alleged subsidies to Boeing.

[The information referred to can be found in the Appendix on page 573.]

Mr. WELDON. The AHS Executive Director stated that "significant research benefits are provided to European helicopter manufacturers by their governments." Could you please provide as much detail on these benefits as is available?

Mr. FLATER. European airframe manufacturers such as Eurocopter (an EADS company) and AgustaWestland (a Finmeccanica company) enjoy close partnerships with European government research agencies. For example, Eurocopter's relationship with ONERA (the French aerospace research agency) and DLR (the German aerospace research agency) strengthened in 1998 with an agreement aimed at creating effective rotorcraft research for the benefit of official services and industry in both countries.

In 1999, a common research program was created for a five year period covering eight research concepts, including;

- The Virtual Aerodynamic Rotorcraft
- The Smart Rotorcraft
- The Comfortable Rotorcraft
- The Advanced Rotorcraft
- The Quiet Rotorcraft
- The Safe Rotorcraft
- The Active Rotorcraft
- The Specialized Military Rotorcraft

The DLR/ONERA partnership was complemented in 1999 by a Research and Technology General Partnership with Eurocopter. Research projects were reviewed and refocused based on input from Eurocopter's Strategic Research and Technology Plan with specific customer needs in the forefront. This produced the following technology thrusts:

- Lower costs and shorter lead times; developing advanced design tools in all fields and especially fluid dynamics.
- Expanded operational capability; simplifying the piloting (digital flight controls and piloting aids) and developing new systems for ice and lightning protection.
- Environmentally friendly helicopters; designing quieter helicopters through passive and active control of rotor blades.
- Greater comfort with reduced cabin noise and vibration; integrating appropriate passive and active systems.
- Greater safety; optimizing crash protection systems.
- Active involvement in the European tiltrotor critical technology projects.

The cooperative activities of the three partners have been coordinated within a process called "Coordinated Action Programs." Significant research programs have sprung from this partnership and long term planning, both of which are giving Eurocopter a competitive advantage in several areas.

Advanced controls—Eurocopter, in partnership with DLR, is researching Fly-by-Light technology and smart material actuators on an EC-135 test aircraft. Near All-Weather Operability—With ONERA, Eurocopter is researching and testing sensors, displays and Man Machine Interface (MMI) technologies on an EC-155. This aircraft is fitted with a position finding system based on GPS and DGPS navigation, a mission computer to manage 4-dimensional flight plans and a 4-axis autopilot to allow steep approaches in zero visibility with DGPS guidance.

Efficiency & Noise reduction—Eurocopter is developing modern airfoils and planforms in conjunction with DLR and ONERA. Their stated goals are a five EPNdB noise reduction, a 6–10% reduction in Specific Fuel Consumption (SFC) and a 15 km/h speed increase.

Digital wind tunnel—Building off of work performed by ONERA & DLR on computational fluid dynamics, Eurocopter has been developing a digital wind tunnel capability in order to allow it to reduce development effort by 30%. This is part of their "virtual helicopter" study, another project with ONERA & DLR, which is aimed at reducing the time from conception to certification of a new helicopter to 3 years.

Over the past five years, the annual budget for these programs has been on the order of 20 million to 30 million Euros. Funding of the research is shared between Eurocopter and the agencies at generally a 50/50 split.

At the EU level, there are also programs that plan and fund technology programs over multiple years that are aimed at increasing the future competitiveness of the European helicopter companies. One example of this is under the European Commission's Fifth Framework research program, where Eurocopter & AgustaWestland have contracts to study tilt-rotor technologies over the period 2000-2005. The objective of the projects is to "Acquire/reinforce European knowledge and key technologies for critical components designed around and aircraft architecture representative of a second generation of tilt-rotor".

Among the critical technology projects of this initiative are the following:

ACT-TILT (Active Control Technology for Tilt-rotor)—Definition and validation of the architecture and control laws of a tilt-rotor flight control system, using real-time man-in-the-loop simulation.

DART (Development of an Advanced Rotor for Tilt-rotor)—Design, manufacture and validation of a full-scale rotor suitable for an advanced European tilt-rotor aircraft.

RHILP (Rotorcraft Handling, Interactions and Load Prediction)—Tilt-rotor flight mechanics and controllability at low speed in the helicopter mode.

ADYN (Advanced European Tilt-rotor Dynamics and Noise)—Tilt-rotor behavior in forward flight in terms of dynamic stability and noise reduction.

TILTAERO (Tilt-rotor Aerodynamics)—Aerodynamic interactions between rotor and wing, rotor and fuselage in the hover and forward flight.

TRISYD (Tilt Rotor Integrated Drive System Development)—Design, manufacture and test of a full-scale integrated drive system

The first three projects are led by Eurocopter and the second three by AgustaWestland. In addition to the helicopter manufacturers, the team includes Mecaer and Televio of Italy, Gamesa and Sener of Spain, FHL of the UK, ZFL of Germany and a group of aeronautical research institutes (CIRA, DLR, NLR, ONERA, CTA), plus universities from the United Kingdom and Spain. IAI and P&WC are also partners in the program. The overall budget for all six critical technology projects is around 43M Euros, half of it funded by the European Commission and half by the industrial partners.

The EU Commission's Sixth Framework funds a project called FRIENDCOPTER, which addresses helicopter improvements relative to environmental and public acceptance. It features the following goals:

External noise levels 10 dB below the current ICAO/JAA rules especially during approach,

A reduction of fuel consumption up to 20% for high-speed flights.

Cabin noise levels below 70 dB similar to airliner cabins for normal cruise flight,

Cabin vibrations below 0.05 g corresponding to jet smooth ride comfort for the same flight regime.

The specific deliverables of the FREINDCOPTER program will include:

Low noise flight procedures especially for approach as guidelines for pilots

A technology of noise absorbing engine inlets and outlets

Methods to identify noise leaks in cabin & systems to actively and passively reduce cabin noise

A control technology to reduce rotor noise, vibration excitation, and fuel consumption by distributed actuation along the blade surface

A Mach-scaled wind tunnel model rotor ready for wind tunnel tests

Leaving aside the debate about which side of the Atlantic has the greater benefit from R&D subsidization, it seems clear the Europeans have a clear advantage in the collaborative relationship they have with Governments and their research agencies. This partnership results in a shared vision of what needs to be done to increase the European competitiveness in the rotorcraft industry, a carefully constructed, long term plan and consistent funding to get there.

By comparison, in the United States NASA has eliminated all funding for rotorcraft research in fiscal year 2006, effectively terminating the Army/NASA Joint Agreement to Collaborate on Rotorcraft Research which has been in place since 1965 (and renewed as recently as 2003). Pursuant to the Army-NASA agreement, the Army and NASA have shared leadership and funding for basic rotorcraft research. In addition, in recent years the Department of Defense budget for rotorcraft research has largely been refocused on improving existing rotorcraft airframes and developing UAVs as opposed to basic manned rotorcraft research. NASA has elimi-

nated all rotorcraft research associated with NASA's Vehicle Systems Technology program and shut down critical national aeronautics facilities, such as the National Full Scale Aerodynamics Complex (the 40'x80', 80'x120' wind tunnels) located at Ames Research Center and the Crash Safety Testing Complex located at Langley Research Center.

Mr. WELDON. The AHS Executive Director's statement also indicates that the rotorcraft product lines from Europe over the last five years equal and in some cases surpass our technology. Could you please provide more detail on these technologies?

Mr. FLATER. Technologies where European rotorcraft companies have made significant progress versus American rotorcraft include:

Active Blade Control (An advanced control scheme improving performance, while reducing noise and vibrations, using control elements integrated into the blade structure.)

Individual Blade Control (An advanced control scheme with similar goals as above, but using in-line hydro-mechanical actuators located in the blade control rods.)

Advanced Blade Planform Shapes (The main goal here is diffusion of blade vortex structure and mitigation of shock interactions when blades slice through trailing vortices of other blades; this phenomenon is also known as blade vortex interaction, or BVI.)

Advanced Performance and Noise Prediction Methodologies (The extremely complex, spiral wake system makes this a yet-to-be fully-solved analytical problem.)

Low Noise, High Efficiency Fenestron Technology (A special fantype anti-torque system reminding observers of "little windows" or "fenestrons.")

Fly by Light (Germany's DLR is flying a dedicated EC-135 test-bed using fly-by-light technology.)

Speed of helicopters. (A-109 tests are underway.)

A string of new designs with advanced design integration resulting in improved performance and reduced operating costs.

CATIA (The most widely-used computer-assisted-design program in aerospace is of French (Dassault) origin.

Mr. WELDON. What has been the level of the rotorcraft industry's IR&D funding each year for the past five years?

Mr. FLATER. The domestic rotorcraft industry is committed to rotorcraft research and advancing technology and safety. For example, the combined investment in rotorcraft IR&D by Bell Helicopter, The Boeing Company and Sikorsky Aircraft during the period 2000-2004 was as follows:

2000	\$183.4 million
2001	\$216.8 million
2002	\$128.2 million
2003	\$135.4 million
2004	\$162.0 million

While Sikorsky does not provide specific details of its company funded programs in the last ten years the company has invested well over a \$500 million dollars in the S-92, and well over \$100 million in dynamics systems and avionics/aircraft systems integration.

Mr. WELDON. What is the E.U. level of investment in aeronautics and related test facilities, each year for the past five years? Is comparable data available for Japan, China, and India?

Mr. FLATER. The E.U.'s spending for aeronautical research—which includes rotorcraft—has grown from just \$45 million (35 million Euros) in 1990-1991 to more than \$1.1 billion (850 million Euros) in the 2002-2006 Sixth Framework Program now underway. The focus of the Sixth Framework, developed by European industry in association with government, is all-composite wing and fuselage structures, efficient low-noise engines, and all-weather hazard protection systems. Europe's aeronautics research is pre-competitive, and performed by large consortia of industry and academia. It is focused on producing results that can be applied to products in the near to medium term. Research priorities are guided by a strategic research agenda fashioned by European industry with the openly acknowledged aim of wresting leadership of the civil aviation industry away from the U.S.

In addition to investments in major E.U. aeronautics programs, the component countries which comprise the E.U. and various regions within those countries have numerous domestic programs with spending levels which equal or, in some cases, exceed investments in R&D by the E.U.

By comparison, funding for NASA aeronautics will drop from well over \$1.2 billion in the mid to late 1990s to \$852 million in the 2006 budget request, to \$727 million

by 2009. This is 23% lower than projected just a year ago. Less than 10% of NASA's budget is for aeronautics—this will fall to less than 6% by 2010 as space exploration spending ramps up. The biggest fall in NASA's funding is in its Vehicle Systems Technology Program, which is cut from \$641 million in 2004 to just \$365 million in the fiscal year 2010 budget request. Rotorcraft research is entirely eliminated for the foreseeable future.

Nothing makes clearer NASA's intent to terminate all or nearly all aeronautics research than the fact that NASA has circulated an internal memo on February 3, 2005 declaring its intent to close a long list of critical aeronautics test facilities in 2006. These include the following:

10x10 Supersonic Wind Tunnel	Glenn Research Center
Hypersonics Test Facility	Glenn Research Center
Engine Research Bldg	Glenn Research Center
(Combustion and Turbomachinery Test Cells)	
Propulsion Systems Laboratory	Glenn Research Center
14x22 Subsonic Tunnel	Langley Research Center
Low Turbulence Pressure Tunnel	Langley Research Center
Vertical Spin Tunnel	Langley Research Center
National Transonic Facility	Langley Research Center
Unitary Wind Tunnel	Langley Research Center
8' High Temperature Model	Langley Research Center
Aerothermodynamics Lab	Langley Research Center
Scramjet Facilities	Langley Research Center
Landing Dynamics Facilities	Langley Research Center

So what will NASA spend its much reduced aeronautics budget upon? We are told that NASA will now focus entirely on four long-term demonstration programs driven by "environment" and "exploration" (e.g., a quiet subsonic aircraft which can't be heard except within airport boundaries, a zero-emissions aircraft, a lowboom supersonic demonstrator, and a remotely operated aircraft which can remain aloft for up to 14 days)—each demonstration tackles just one barrier, none of which are on industry's horizon for the next 10 years.

Effective with the current proposed budget, NASA fails to support any precompetitive 6.1 and 6.2 aeronautics research needed to advance aerospace, including rotorcraft, in the middle term. More important, in 2006—for the first time, NASA fails to support any basic rotorcraft research at the three Rotorcraft Centers of Excellence—the University of Maryland, Penn State University, and Georgia Institute of Technology—prompting large cuts in post-graduate training programs supporting future aeronautical engineers.

Mr. WELDON. What is your association's comment on DoD's characterization of the U.S. rotorcraft industry as a "cartel"—high unit revenues associated with rotorcraft remanufacture programs provide "robust financial returns—with little incentive for innovation . . . little real competition . . . since few contracts were competed; and they have formed industrial relationships among themselves that smooth revenue flow absent new program starts . . ." and "pressing operational needs are encouraging a complacent domestic rotorcraft industry to focus on the lucrative near-term revenues from remanufacture of legacy platforms and from after-market support"?

Mr. FLATER. These comments are from a working draft of a recent study by the Office of the Deputy Undersecretary of Defense (Industrial Policy), "The Vertical Lift Industrial Base: Outlook 2004-2005," issued in July 2004. The final report—which does not contain most of these references—incorporates responses from the rotorcraft industry leadership and the report's recommendations, contained in Part III (pp. 29–31), provide a concise roadmap involving government industry partnership to resolve some of the issues implicit in the quotes cited above.

The reference to "cartel" is inappropriate, since it was the DoD—not industry—that directed Bell and Boeing to team on the V-22 Osprey and Boeing and Sikorsky to team on the now-terminated RAH-66 Comanche. The emphasis on remanufacturing programs, as opposed to new-builds, derives from constraints placed on DoD budgets in the post-Cold War era and the fact that, by their very nature, such programs were sole-sourced to the original equipment supplier.

More recently, however, Bell Helicopter, The Boeing Company and Sikorsky Aircraft have—using internal funding—have introduced new lean-manufacturing equip-

ment, technologies and skill sets into their respective production lines. As a result, government customers can now purchase new-build Sikorsky UH-60 Black Hawks and CH-53 Sea Stallions, Boeing CH-47 Chinooks, and Bell H-1 attack and transport helicopters for prices equal to or less than remanufactured airframes. As a case in point, the Boeing Company recently announced a price reduction of \$12 million for a new-build CH-47F Chinook.

Additionally, the characterization that the domestic rotorcraft industry focuses on lucrative near-term revenues that provide "robust financial returns" does not reflect that profits realized from these types of contracts is limited by Government regulations and also the baseline established when the contracts were competitively bid. In fact, the structure of these types of contracts actually inhibits domestic rotorcraft suppliers from achieving world-class financial returns.

As the recent VXX competition and decision fully demonstrated, the characterization of the U.S. rotorcraft industry as uncompetitive and complacent is also inaccurate. The U.S. rotorcraft industry is fighting for its very survival in competing against extremely aggressive—and capable—European competition.

As previously noted, Sikorsky has invested hundreds of millions of its own monies to design, develop and build the S-92 medium lift transport. The S-92 technology innovations included a highly advanced dynamic system featuring a new rotor design, transmission, and active vibration control. The aerospace industry recognized the S-92 for creating a new standard in safety and performance in the industry, when the S-92 was awarded the American Helicopter Society Howard Hughes Award for "recognition of an outstanding improvement in fundamental helicopter technology" and the prestigious 2002 Robert J. Collier Trophy as "the greatest achievement in aeronautics or astronautics in America."

It is worthy to note that Sikorsky is the only helicopter manufacturer in the world to design, develop, and begin production of a new medium lift rotorcraft in the past 25 years solely through the investment of its own research and development dollars. By comparison, the governments of Europe have co-funded the development of three medium lift helicopters during this same period: Super Puma/Cougar, EH-101 and NH-90.

With respect to global market competition, the domestic rotorcraft industry has demonstrated throughout its history that when allowed to compete on a level playing field it has won the majority of competition against its European competitors. Over the last ten years, United States domestic rotorcraft OEMs have realized about a 37% capture of the aircraft ordered in the government medium utility market outside of Europe, but have only captured 6% of this market in Europe. Over the same time period, 92% of the helicopter orders within Europe have been awarded to European rotorcraft OEMs, while they captured only 18 % in the rest of the world. During this time, U.S. airframe manufacturers have won major competitions over European competitors in several countries including competitive wins in Canada (commercial and military) and Singapore just within the past year.

With respect to technology innovations, Sikorsky, Bell Helicopter, and The Boeing Company are currently developing fly-by-wire technology and other system integration capabilities that will provide a better total solution for the industry's customers.

Bell Helicopter is developing the "Modular Affordable Product Line" ("MAPL"), which is a suite of three advanced light helicopters based on maximum commonality of components for initial cost reduction as well as operating and support cost reduction.

The domestic rotorcraft airframe industry remains more committed than ever to implementing major changes and reforms that will reduce costs and impose a culture of innovation and responsiveness to customer needs, from introducing lean manufacturing capabilities into the factory, to developing state-of-art system integration capabilities. From eliminating warehousing to implementing new manufacturing cells based on the Toyota production model, Sikorsky is transforming to provide its customers with the best value proposition. An example of this transformation is that Sikorsky has doubled output for critical parts such as tail rotor blades, with significantly better yields and less "footprint" than just one year prior through the implementation of lean manufacturing. As several high-level government officials have witnessed first hand, including Suzanne Patrick (Deputy Under Secretary of Defense for Industrial Policy), industry members are making the radical changes necessary to render manufacturing operations leaner and more efficient and more competitive in the global market place.

QUESTIONS SUBMITTED BY MR. LOBIONDO

Mr. LOBIONDO. How many helicopters have been lost so far in Iraq and Afghanistan? How do you plan to replace them? Will the current competition for the Presidential helicopter influence your decision?

Admiral WINNS. We have lost a total of 21 helicopters (see table below) while in a deployed status since the beginning of OEF/OIF. Of the 21 aircraft lost, 12 USMC aircraft have been lost in Iraq and Afghanistan, 2 USMC aircraft were lost in Horn Of Africa, and 7 other aircraft were lost in various other deployed locations. The current production lines are closed on all our USMC aircraft, except the KC-130J. In order to mitigate these losses we will continue to push the transition to the MV-22 at the fastest rate possible. Additionally, the UH-1N and AH-1W losses are unable to be replaced, so we will continue our program to remanufacture older platforms into modern UH-1Y and AH-1Z aircraft. Unless we can start a "new build" production line for UH-1Y and AH-1Z, we will continue to suffer a shortfall in these platforms. The CH-53E shortfall will be partially mitigated if we receive requested supplemental funding for the restoration of 5 aircraft from AMARC. We plan to replace them through the PPB&E process. The current Presidential helicopter competition will not influence our decision to replace helicopter losses.

Count of BUNO	
TMS	Total
AH-1W USMC	4
CH-46D Navy	2
CH-46E USMC	2
CH-53E USMC	4
MH-53E Navy	2
SH-60B Navy	3
UH-1N USMC	4
Grand Total	21

Mr. LOBIONDO. Do you think there are other factors besides which helicopter can most securely and comfortably carry the President that should be given consideration in this process? If so, what would you identify as these factors?

Admiral WINNS. "The Naval Air Systems Command's Competitive source selection policy and procedures include the following standard source selection factors: Technical, Past Performance, Experience and Cost/Price. These are the factors considered in making the selection for the award."

Mr. LOBIONDO. What is the Navy's plan for equipping its rotorcraft fleet with aircraft survivability equipment?

Mr. LAUX. Our most immediate and dramatic efforts have been focused on engineering changes to in-service aircraft (such as the AH-1W), with the greatest attention and urgency placed on those aircraft in harm's way. As I commented in my written statement, we responded to the changing situation and threat abroad—the Fleet told us what they needed in each type aircraft and NAVAIR implemented every survivability upgrade before the aircraft flew combat missions. This will continue as aircraft rotate into theater.

The Navy and Marines have a long-term plan to address survivability, tailored for each type/model/series helicopter, driven by its mission and the threat. These include a variety of susceptibility and vulnerability reductions achieved through active and passive measures that run the gamut from extremely sophisticated missile decoy systems to simple armor. The Department of the Navy is actively pursuing these enhancements through production upgrades (such as the MH-60R/S) and completely new aircraft (such as the V-22). We continue to observe and learn from our own experiences as well as our sister services, and will continue to adapt to a changing world.

Mr. LOBIONDO. How many helicopters have been lost so far in Iraq and Afghanistan? How do you plan to replace them? Will the current competition for the Presidential helicopter influence your decision?

General HELLAND. We have lost a total of 21 helicopters (as of 4 Mar 04, see table below) while in a deployed status since the beginning of OEF/OIF. Of the 21 aircraft lost, 12 USMC aircraft have been lost in Iraq and Afghanistan, 2 USMC aircraft were lost in Horn Of Africa, and 7 other aircraft were lost in various other deployed

locations. The current production lines are closed on all our USMC aircraft, except the KC-130J, at this time.

So in order to mitigate these losses we will continue to push the transition to the MV-22 at the fastest rate possible. Additionally, the UH-1N and AH-1W losses are unable to be replaced, so we will continue our program to remanufacture older platforms into modern UH-1Y and AH-1Z aircraft. Unless we can start a "new build" production line for UH-1Y and AH-1Z, we will continue to suffer a shortfall in these platforms. The CH-53E shortfall will be partially mitigated if we receive requested supplemental funding for the restoration of 5 aircraft from Aerospace Maintenance and Regeneration Center. The current Presidential helicopter competition will not influence our decision to replace helicopter losses.

Figures are correct for the timeframe in which the questions were asked.

Count of BUNO	
TMS	Total
AH-1W USMC	4
CH-46D Navy	2
CH-46E USMC	2
CH-53E USMC	4
MH-53E Navy	2
SH-60B Navy	3
UH-1N USMC	4
Grand Total	21

Mr. LoBIONDO. Do you think there are other factors besides which helicopter can most securely and comfortably carry the President that should be given consideration in this process? If so, what would you identify as these factors?

General HELLAND. The Naval Air Systems Command's Competitive source selection policy and procedures include the following standard source selection factors: Technical, Past Performance, Experience and Cost/Price. These are the factors considered in making the selection for the award.



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